THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
June 19, 1989 · Vol. XXIII · No. 25 · 130 Pages · $2/Copy · $48/Year

COMPUTERWORLD

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IBM to bet PC chips on 486

BY WILLIAM BRANDEL and DOUGLAS BARNEY
CW STAFF

NEW YORK — IBM is expected to try to regain the image of technological leadership in the personal computer market by introducing a plug-in board that boosts its Personal System/2 Model 70 A21 with Intel Corp.'s I486 processor. IBM plans to be the first PC vendor out of the gate with an I486-based introduction this week at PC Expo, four sources confirmed independently.

A source at an independent software firm, claiming to have seen the I486 module last week, said IBM has designated it the Power Platform. The computer giant, the sources said, is trying to offset perceptions that it is lagging in the PC market with an aggressive move to leapfrog rival Compaq Computer Corp.

In one of IBM's most aggressive marketing moves to date, the company will promise to double the performance of its PS/2 with a chip that is still several months away from delivery.

IBM Chairman John Akers "is telling the world, 'We won't be the last ones to ship this product,' " said David Wu, an analyst at S. G. Warburg & Co., a Wall Street brokerage firm. "He's sick of Compaq kicking him in the shin."

IBM currently trails Compaq in 80386-based system sales, according to Storeboard, Inc., a Dallas-based company that tracks PC sales in U.S. dealerships. According to Storeboard figures, IBM had 31.9% of units shipped and 33.2% of revenues in April, while Compaq has

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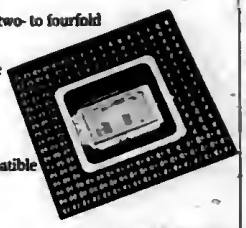
Leapfrogging

With its expected I486-based system, IBM will capitalize on a number of performance advantages over the Intel 80386

- Runs 80386-based software with a two- to fourfold increase in performance
- Partial RISC design executes some instructions in single clock cycle
- On-chip cache reduces memory cycles
- On-chip floating-point unit is compatible with 80387 math coprocessor



CW CHART: FRANK C. FITZPATRICK

Kodak may farm out IS centers

Talks with EDS, IBM enter the final stages

BY CLINTON WILDER
CW STAFF

ROCHESTER, N.Y. — Eastman Kodak Co. is negotiating with Electronic Data Systems Corp. and IBM for a contract under which one of the two will consolidate and run some or all of Kodak's information systems operations here. The contract could be announced within a month.

If consummated, the agreement would make Kodak, ranked 18th in the Fortune 500, one of the largest firms to choose an outside vendor for a full-service IS facilities management contract.

Kodak is a longtime EDS customer for various financial and manufacturing systems development projects. The current negotiations grew out of that relationship, and then IBM entered the game. No formal bid process has taken place, as it did with Merrill Lynch & Co.'s recent telecommunications contract award to MCI Communications Corp. and EDS [CW, June 12].

"We have been talking to EDS for a few months now about doing something beyond the nor-

Continued on page 107

Swollen inventories come back to haunt Ashton-Tate

BY DOUGLAS BARNEY
CW STAFF

TORRANCE, Calif. — If the adage "when it rains, it pours" is true, then Ashton-Tate Corp. got drenched last week after admitting that it expects a loss of $15 million for the current quarter and a possible loss for the next.

The expected loss is largely attributable to excess inventory and lagging demand for the flagship Dbase IV product, which continues its fierce uphill battle for broad market acceptance.

Ashton-Tate Chairman Ed Esber has called the personal computer database management systems market a war. His firm apparently made a tactical error when it overestimated demand for Dbase IV 1.0 at the same time that customers chose to wait for the upcoming version, which adds crucial features. The result was a distribution channel up to its ears in Dbase and precious few new orders coming into Ashton-Tate. "It was a combination of our optimism and the channel's optimism," Esber said.

The loss ends a long and successful streak for Ashton-Tate, which had nailed down record quarter after record quarter. But today, not only has competition for PC database dollars intensified, but Dbase IV has been

Continued on page 4

Can AS/400 avoid sophomore slump?

BY ROSEMARY HAMILTON and ROBERT MORAN
CW STAFF

As the Application System/400 celebrates its first anniversary this week, IBM has cause to rejoice and worry at the same time.

IBM intended to win a respectable slot in the midrange market with the AS/400, and it did just that. It so successfully handled the typical early product glitches that most users, even those who now report hellish migrations, now describe themselves as satisfied customers.

However, unless IBM addresses some lingering AS/400 problems soon, it could start to lose the momentum it built, observers said last week.

Users and analysts contacted gave the midrange line an overall thumbs-up, but they said there remain two outstanding flaws with the AS/400 that could end up causing users to put off a purchase or force them to look elsewhere.

The first problem is migration from the System/36, which IBM concedes has been an unnecessarily difficult task. The second is an inadequate tape-drive subsystem, which has frustrated most high-end users and now has some looking to other vendors for help.

Last week, IBM said it plans to fix both problems this year. Since the beginning of 1989, IBM has been offering additional assistance to users with System/36 migration problems. A spokesman said earlier this year at least 50 customers were

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Big bundle

Unbundling IBM software in 1969 spawned a $10 billion market. Are IBM and DEC trying to turn back the clock? Stories, page 6.

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On the reluctance of top executives to treat IS investments as an asset. See story page 88.

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DBMS wars: A contest in which the outcome may be a new solution for seamless corporate computing. Page 63.

UPDATE

Trouble in la-la land? Maybe. Key elements of the small systems market appear to be in broad retreat. Sun Microsystems is learning the hard lessons of runaway growth and the internal disarray it can provoke. Ashton-Tate has hit the wall and will be smeared with red ink this quarter and perhaps next. IBM may actually leapfrog the PC clone community — itself in disarray — with the first Intel 80486-based systems package. Meanwhile, elements of the mainframe market are showing signs of renewed life. Does anyone have a computer industry barometer that works?

Heinz's McCabe hopes to save $500K a year with new network. Page 49.

EXECUTIVE BRIEFING

■ **Kodak contemplates farming out** its data center operations to Electronic Data Systems or IBM. If an agreement is reached, Kodak will be one of the largest companies to join the growing movement to contract data center operations to a third party. **Page 1.**

■ **The bundling issues rise again,** 20 years after IBM surrendered to industry pressure and unbundled its software. The 1969 move created the third-party software industry and changed the computing world. **Page 6.** However, some vendors are up in arms again about recent moves by DEC and IBM to fold database management software into their operating systems. For the moment, users do not seem to care. **Page 6.**

■ **The AS/400 also celebrates an anniversary this week.** One year after its introduction, the machine has sold well to System/38 users, but tape storage and System/36 migration problems cloud its future. IBM says it will quickly address both issues. **Page 1.**

■ **As their worlds collide,** vendors of both PC and large-system database management systems are trying to position themselves as the ideal providers for the corporate database. The confrontation will benefit corporate DBMS buyers, although choosing a product remains difficult. **Page 63.**

■ **Surprise!** Sources say IBM will introduce an Intel 80486-based PS/2 this week that isn't even shipping yet. IBM wants to polish its image as a technology leader by beating all competitors at delivering a system based on the 20-MIPS chip, the sources say. **Page 1.**

■ **Users criticise monopolies** held by local exchange carriers over local-line services and cast hopeful eyes toward teleport services. The users say teleport services give them lower costs and quicker access to technologies that regional holding companies are only beginning to install. **Page 4.**

■ **Control Data continued to shrink last week.** Once one of the biggest computer companies, troubled CDC sold off its most profitable unit, disk-drive maker Imprimis Technology, to Seagate Technology. **Page 81.**

■ **Corporate information systems may be getting no respect** from corporate executives, and that lack could contribute to the company's failure. A researcher says that less than 10% of corporate executives are truly enamored with technology, which makes it tough for IS executives to convince their peers in other departments to accept technology as an asset. **Page 57.** However, one area in which technology seems to be playing a larger role is in the collection and analysis of competitive intelligence. **Page 62.**

■ **The Class of 1989 may actually be virus carriers.** IS managers may want to ensure that their companies' new hires don't bring with them virus-infected software that they used during their college days. **Page 37.**

■ **Managing the Mac environment is a growing IS specialty.** Superficially similar to managing IBM and compatible PCs as well as other systems, the job also carries an aura of uncertainty. The Mac may transform the mild-mannered office worker into a counterculture Mac activist. But managing the Mac environment requires only a slightly different perspective on the manager's part along with a strong ability to deal with the unique Mac elements. **Page 75.**

■ **Speaking of managing the Mac,** a new user organization has sprouted, fed in part by Apple funds, to address the concerns of managers responsible for large Mac installations. MacIS held its inaugural meeting in Chicago last week. **Page 107.**

■ **The violence and repression in China** has not had a measurable impact on the IS operations of joint China-U.S. business ventures operating there. However, U.S. firms have withdrawn many managers, leaving such areas as IS without leadership. **Page 109.**

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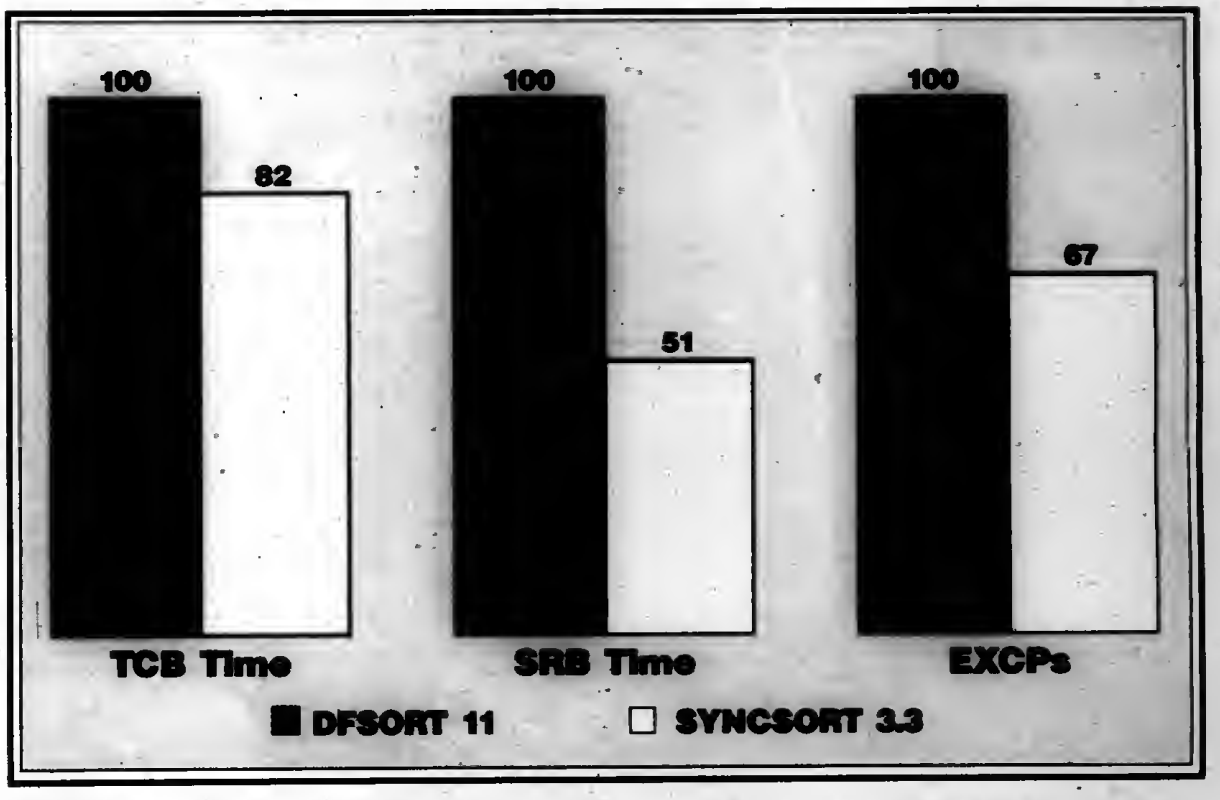

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Users blast BOC monopolies

BY ELISABETH HORWITT
CW STAFF

BOSTON — Local exchange carriers need serious competition to force them to respond to user requirements for rates and service, and an aggressive, fast-rising breed of teleport vendors may be the ones to provide it, several telecommunications users said last week.

P. CHARLES LABOCCHI

Goldman Sachs' Compitello

At the Association of Data Communications Users (ADCU) conference here, speakers criticized exchange carriers' essential monopolies over local line services in major metropolitan areas.

"If I were subscribing to services in New York City, I think I would like to have 30% of those loops provided by non-BOC companies," said John Compitello, vice-president of voice products and services at Goldman, Sachs & Co. and chairman of ADCU's Public Policy Committee. "Right now, the BOCs have about 95% ownership [of local lines], and we haven't seen inroads in the last year to reduce that."

The Federal Communications Commission should not let local exchange carriers into information services until there is significant competition from "teleport-like services," Compitello added.

A growing number of teleport companies are competing with the Bell operating companies (BOC) for local loop customers in major cities, typically offering discounts as well as enhanced services that the BOCs may not have yet introduced.

Shearman & Sterling has been trying unsuccessfully for years to get services such as fractional T1 from New York Telephone, said telecommunications manager Ronald E. West. Now, the New York law firm is considering fractional T1 offerings from Merrill Lynch Teleport Technologies, Inc. and an aggressive newcomer, Metropolitan Fiber Systems, Inc. in Oakbrook, Ill.

Securities companies in New York have attained a 35% reduction on their local services by using the Merrill Lynch Teleport rather than New York Telephone, Compitello said.

Teleports also provide large businesses with much-needed backup facilities for their metropolitan-area networks, said Henry Levine, a partner at Washington, D.C., law firm Morrison & Foerster. BOCs typically route all the lines from one customer's site through one central office, so that "if your central office is down, you are" too, Levine said.

Many of the benefits that teleports offer relate to their ability to offer end-to-end fiber networks, sources said. A number of BOCs are laying down fiber, but primarily between their own offices, while the majority of connections to user premises remain copper-based, West said.

On the other hand, teleport services will only lay fiber to a customer's doorstep if they can get enough business from the building to justify the investment, West said. The good news is that teleports have lowered their minimum entry level to "less than five T1s," he added.

Surviving in the teleport market is tough, according to Teleport Communications-Boston spokesman Larry Bugden. "We're in a real dig-down-and-get 'em battle," Bugden said. One of the company's competitors, Teleport Boston Corp., recently dropped out of sight — practically ceasing operations — industry sources said.

Still, the market has filled up recently with aggressive entries that are "likely to be visible," Bugden said. Teleport Communications is expanding into San Francisco, Miami and Los Angeles and is eyeing other cities, he added. Metropolitan Fiber Systems plans to have teleports in 12 cities by year's end. "If nothing else, we've made the RBOCs more responsive to their customers," Bugden said.

Ashton-Tate

FROM PAGE 1

racked with delays, reports of bugs and its inability to tie to back-end databases such as the Ashton-Tate/Microsoft SQL Server.

Esber defended Dbase IV against critics of its bugs. "It is like trying to judge a human being by a wart," said Esber, who argued that the bugs affected a small percentage of users.

Pressure on Ashton-Tate has only begun to intensify. With IBM increasingly aggressive, Microsoft Corp. and Lotus Development Corp. ready to hop in and the Dbase cloners' ever vigilant efforts, competition in the PC DBMS could become brutal. Ashton-Tate has reached its database crossroads and must deliver reliable new-generation tools to prosper, observers said.

Financially, Ashton-Tate has lagged behind its competitors, growing only 9% in fiscal 1988, according to "Soft-letter," an industry newsletter. This compares with the 65.2% average growth rate for the top 10 independent software vendors, according to "Soft-letter."

The firm has long known it had an inventory problem; it just did not know how big a problem it was. After surveying its dealers and distributors recently, Ashton-Tate decided to come clean, a move that forced its stock down some 20% in one day. "It is kind of like an alcoholic who stands up and says, 'I am so and so, and I'm drunk, and I need help,' " Esber said.

Those buying Dbase IV are largely doing prototype work, at least among the U.S.'s largest firms, said a source close to Ashton-Tate. However, prototyping use does not generally create significant product demand.

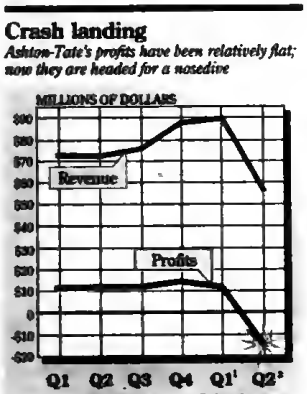
Users are often simply happy with what they have got. For Sam Burton, who developed a hotel and resort reservation system, Clipper from Nantucket, Inc. is just the ticket. Burton does not need the end-user-oriented improvements such as menuing and instead is focused on programming improvements. "I like the direction of Clipper," Burton said.

According to Framingham, Mass.-based International Data Corp. (IDC), by the end of January, Ashton-Tate had sold approximately 300,000 copies of Dbase IV.

But so far, half are still sitting in warehouses or dealer shelves, said IDC software analyst Nancy McSharry.

Crash landing

Ashton-Tate's profits have been relatively flat; now they are headed for a nosedive



¹ Fiscal year changed to coincide with calendar year; January sales included in figures for both this quarter and preceding quarter

² Projected

SOURCE: ASHTON-TATE CORP. CW CHART: FRANK C. O'CONNELL

Dismissed exec loses school suit

BY J. A. SAVAGE
CW STAFF

FORT WORTH, Texas — Former Data Processing Director Ray Harrison's $10 million lawsuit against the Arlington Independent School District for alleged defamation, breach of contract and wrongful discharge was dismissed late last month.

Harrison was barred from his office by guards and suspended from his job three years ago. He claimed he was resisting pressure from the district's superintendent to buy an IBM System/38 and software from Phoenix-based Prescription Learning Corp. Two years later, the school superintendent resigned from his job after it was revealed he took transcontinental trips sponsored by Prescription Learning [CW, Nov. 28].

U.S. District Court Judge Eldon Mahon, in a decision dated May 31, ruled that Harrison had relinquished all rights to sue the school district when he accepted a $109,000 dismissal settlement and released the district from any and all claims against it. Harrison said last week it is likely he will appeal.

Harrison's 20 claims included age discrimination, fraud and conspiracy. The case turned on the agreement issue, according to Don Buckman, attorney for the school district.

The court said that "evidence suggests the data processing operations under Mr. Harrison's supervision were in an ominous state of disarray. His department appeared to be at the mercy of a computer technician who worked nocturnally and sporadically, often from a makeshift office at Denny's Restaurant."

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Dave Annis

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Software industry born with IBM's unbundling

BY STANLEY GIBSON
CW STAFF

In the late 1960s, the software industry was a small, offbeat, almost cottage industry with doubtful potential.

Then came June 23, 1969, which stands as Independence Day for software firms. That was the day IBM announced separate pricing for software, services and hardware.

"I was enthusiastic about it. Everybody likes to pay for only what they use. However, as you unbundle, the cost of each part goes up," said Irv Sitkin, vice-president of corporate administration at Aetna Life and Casualty Co. in Hartford, Conn. "We were concerned we would be nickeled-and-dimed to death."

Faced with paying steep prices for programming work, many customers began to hire their own programming staffs. At Aetna, Sitkin instituted training programs to replace those previously provided by IBM. However, he did not purchase third-party software at first but waited until 1976 to purchase Cullinane Corp.'s IDMS.

Although a number of software firms were founded prior to the unbundling date, June 23 was the symbolic starting point in the scramble to build software, the companies to sell it and the fortunes to be made from it.

"It created the industry we're in. It was very difficult to sell software before," said Richard Lilly, who co-founded Software International in 1968 to sell manufacturing resource planning to large manufacturers.

There was no rush following IBM's conferring of legitimacy, said Tom Nies, president and chief executive officer of Cincom Systems, Inc. "We didn't see a tremendous movement into the business. The trend was well under way before."

Indeed, an International Data Corp. report in 1967 listed nine independent software vendors, stating that many more such firms existed and others were being founded monthly.

IBM's unbundling freed these independents and set a precedent for other hardware vendors, creating a tradition of charging separately for hardware and software. As a result, software created by third parties has driven platforms from other vendors, such as Digital Equipment Corp.'s VAX systems.

By fostering a wide selection of software, the unbundling also greatly assisted the success of the IBM plug-compatible computer industry, when firms such as Amdahl Corp. introduced their systems in the mid-1970s.

For the pioneers in the "Class of '69," the early days were full of hectic, seat-of-the-pants adventure. Dodge, a former high school math teacher, recalled renting a tiny office and creating much of the original product and documentation himself. He would toss the software — a box full of punched cards — into his car and drive it to the local post office.

Dodge and other trailblazers would have remained in obscurity without the IBM move. Instead, a host of colorful figures sprang forth. Marty Goetz, founder of Applied Data Research, Inc., a software developer whose products and legal efforts led in part to IBM's unbundling, gained a new standing in the industry.

Whether users desired unbundling or not is subject to opinion. "The users, the market insisted that it happen," said Frederic Withington, an independent consultant in New York, then employed at Arthur D. Little, Inc. Before their growing maturity led them to desire separate pricing, Withington said, "Users wanted their hands held. They had very little confidence."

"There was almost no pressure from the users," countered Phil Dorn, president of Dorn Computer Consultants, Inc. in New York. "They didn't give a damn. I never heard any users yelling about antitrust," said Dorn, at that time an information executive at Union Carbide Corp. and vice-president of the Share user group.

Many users figured that unbundling would cut costs. Although IBM instituted a 3% hardware price cut, most users saw no savings. Some saw increases. One reason prices went up was because the newly legitimized software vendors raised them. Lilly said, "We were doing consulting for $300 a day. We heard IBM was going to charge $280 a day for systems engineers, so we said, 'We've got to raise prices to $400 per day!' "

Behind the decision

IBM unbundled for a combination of reasons, said Howard Figueroa, IBM vice-president of commercial and industry relations, who worked on the IBM study that led to the recommendation to unbundle.

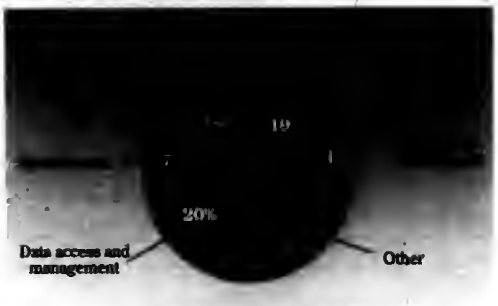
First, IBM was facing stiff development costs and a growing shortage of programmers to write software for its customers. In addition, the U.S. Department of Justice filed its 13-year-long antitrust suit in January 1969. Between January and June, Goetz's ADR and three other firms filed suit against IBM for restraining competition. All the suits mentioned IBM's single-package pricing. In addition, IBM felt it could make money selling software and services, Figueroa said.

But for IBM, the decision meant navigating uncharted waters. "Could you charge for software? Could you protect it with copyrights? Those were questions that in 1969 were not fully answered," said Figueroa, who added, "There was concern about what the effect on our own revenues would be."

STANLEY GIBSON

A threat to independence?

Independent U.S. vendors are concerned that IBM wants a piece of the lucrative pie for IBM mainframe software



Total market: $9.7 billion

SOURCE: INTERNATIONAL DATA CORP. CW CHART: TOM MONAHAN

Software firms fear return to old ways

BY STANLEY GIBSON
CW STAFF

By linking proprietary database management systems and operating systems, Digital Equipment Corp. and IBM have resurrected the specter of bundling. In doing so, they have aroused the ire of the independent software industry.

"The AS/400 set the trend, and DEC followed it. We are trying to suspend or reverse the trend," said Roel Pieper, vice-president at Software AG of North America, Inc. At Software AG's request, Adapso recently adopted a motion questioning the legality of the vendors' actions. Pieper said Software AG will soon file an identical complaint with the European Economic Community.

Although the issue of bundling — charging one price for a number of components including both software and hardware — is of vital interest to independent software vendors, not all users are concerned.

"I haven't seen it as negative so far," said Jack Morgenstern, vice-president of information systems development at Merrill Lynch & Co. in New York. Selling a DBMS with an operating system can eliminate the long evaluation process, he explained, adding, "The other side is that you get tied into one environment. That could be bad." He said competition in the software industry is too strong to be curtailed at this point.

Cincom's Nies *recalls early days of unbundling*

However, James Matsey, corporate director of information systems at Reynolds Metals, Inc. in Richmond, Va., offered, "When there's no competition with IBM, they charge a premium price. It's getting increasingly difficult to buy non-IBM software and tie it into their systems."

IBM has linked a Communications Manager and Data Manager in OS/2 Extended Edition. Also, IBM sells the AS/400, which like its predecessor, System/38, includes a relational DBMS integrated with its operating system.

Although IBM's DB2 is not mentioned in Adapso's complaints, IBM has aggressively marketed it with its 370 family of mainframes, establishing it as a de facto standard. IBM shuns the word 'bundling,' but has said it will "tightly integrate" DB2 with its MVS/ESA operating system. IBM's success with DB2 has caused software firms to be alarmed at a hardware vendor's dominance selling a DBMS that runs on its own systems.

Earlier this year, DEC included a runtime version of RDB with its VMS operating system. Two weeks ago, DEC announced it would similarly offer an RDBMS based on Relational Technology, Inc.'s Ingres with its Ultrix version of Unix.

"It's account control," said Charles Bachman, president of Bachman Information Systems, Inc. in Cambridge, Mass. Hardware vendors are anxious to sell both the operating system and DBMS to users, because customers using those components historically buy many others from the same vendor, Bachman claimed.

IBM, not surprisingly, takes a different view. "You can always say, 'Why isn't every part separate?' " said Robert Berland, IBM vice-president of software vendor strategy and support. "Where you draw the line has been the debate in the past and will probably be the debate in the future," Berland added.

Joe Menard, OSF/Ultrix marketing manager at DEC, defended his firm's actions. "We see this as a natural evolution of the operating system. A customer can choose to use it [the DBMS] or not use it." At the same time, he said, "We expect we'll continue to see significant third-party sales."

"There is no question it is rebundling, even though it is being charged for. They are bundling software with other software, if not with hardware," said Tom Nies, president and chief executive officer of Cincom Systems, Inc.

Despite the software vendors' agitation, an underlying technological trend is at work, which will be difficult to stop, according to Frederic Withington, a New York-based independent consultant.

"Unbundling took place because customers were prepared to shop. Rebundling is happening because of commoditization," he explained. The increasingly generic quality of software and hardware is leading vendors to add value through packaging, he said.

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NEWS SHORTS

Around it goes, where it stops . . .

Following the recommendation of an independent evaluation committee, much-troubled disk drive vendor Miniscribe Corp. fired a group of officers and other employees last week and allowed another group — including company President and Director Gerald Goodman — to resign. The committee was created earlier this year to investigate both the allegations of a class-action suit now pending against the company and the company's financial operations. Last month, committee findings led to Miniscribe's warning that its past three years' worth of financial statements should not be trusted. A Miniscribe spokeswoman declined to identify the currently departing employees, the reasons for their severance or the number of employees affected.

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In English this time

What was that command? Never mind. For those neophytes with little or no experience in on-line searching, Dowquest just might be able to help. Using a new application running on a Thinking Machines Corp. supercomputer, the Dow Jones News/Retrieval service — part of Dow Jones & Co. — will enable users to perform searches in plain English for information contained in the on-line business information service. Dowquest can scan more than 150,000 articles from a collection of 185 business publications.

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Apple reclaims Sun VP

At least one person who possibly should know seems to believe that there is more accounting for Apple Computer, Inc. than for Sun Microsystems, Inc. Sun Vice-President of Finance and Chief Financial Officer Joseph Graziano abruptly resigned last week from both offices to return to the halls of former employer Apple as senior vice-president and chief financial officer. Graziano, a veteran certified public accountant who filled the position of treasurer at Rolm Corp. prior to first climbing on board Apple in 1981, replaces Deborah A. Coleman, who is on medical leave.

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Candle lights up data center

Candle Corp. last week announced Omegacenter, a data-center management system that handles MVS, IMS, DB2 and CICS sessions on one console screen. Candle President Aubrey Chernick said the new product will help data centers improve productivity, lower costs and maintain service levels to end users. Pricing is about $100,000 for a high-end system at a new site, Candle said. Users of Candle's Omegamon software would pay approximately $25,000 for an upgrade.

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Lotus offers deal

Lotus Development Corp. is both priming the pump for 1-2-3 Release 3 and stressing the interoperability of its product line with its 1-2-3 Perfect Fit offer. The offer, announced last week, gives customers of Release 3, expected to ship this week, and Release 2.2, expected in the third quarter, a $100 rebate if they also buy Freelance 3.0 or Manuscript. These products share data effectively and can establish live links between applications.

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Lotus presses suit

There was a hearing in Boston last week concerning Lotus' suit against Paperback Software International for copyright infringement. The judge ruled that the case will be dealt with very carefully and will be broken down into its many constituent parts. This might take a bit longer, but in the end we may have a clearer view of what is protectable and what is not.

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East to meet West

British Telecommunications PLC said recently that it and six other firms from various countries have joined the Soviet Union in a feasibility study to build a trans-Soviet fiber-optic communications link connecting Europe and Japan.

Next, Canon test Asian waters

BY J. A. SAVAGE
CW STAFF

FREMONT, Calif. — Claiming moral high ground with his contribution to leveraging the balance of U.S. trade with Japan, Next, Inc. President Steve Jobs said last week that the firm will distribute all-U.S.-made workstations to Asia through Tokyo-based Canon, Inc.

In return for a "monogamous" distribution relationship whereby Canon will carry no other Unix workstations, Canon is contributing $100 million to Next's coffers, amounting to a 16.6% share of Next.

Canon reported $8.8 billion in revenue last year and claims to be the second largest workstation, personal computer and office automation organization throughout Japan, next to NEC Corp.

Next's workstation is slated to be available in quantity to the U.S. commercial market through Businessland, Inc. this fall. This delivery date is ahead of the original schedule, according to Jobs.

While not supplying any numbers, Jobs said, "Some systems are moving out to corporate America. Businessland is selling every one they can get their hands on."

Jobs said that the money from Canon's investment is not immediately necessary for operations because the company has plenty in the bank from the deals it has closed with IBM. Instead, Next will "ease concerns people have about long-term stability at world-class levels."

"It's not only the cash; it's the synergy between Canon and Next," said Infocorp analyst Peter Teige, referring to Canon's prior technology arrangements with Next.

Canon technology is in the workstation's printer and optical storage disk.

"Canon, as part of the company, adds to that feeling of stability and permanence; it gets them down the road of not just being a start-up," Teige said.

Canon, which also distributes Apple Computer, Inc. products, said it does not see a conflict between the two companies.

"We don't see any competition. Next's product is in a field different from Apple's," said Hiroshi Tanaka, senior managing and representative director at Canon's business machines sector, through an interpreter.

Oracle plugs Unix gap

BY MITCH BETTS
CW STAFF

BALTIMORE — Oracle Corp., noting that user acceptance of Digital Equipment Corp.'s Decstation 3100 has been hampered by the lack of available software, said that its flagship relational database management system is now available for the Unix workstation.

The announcement was made June 14 at the Usenix Technical Conference and Exhibition held here, six months after DEC unveiled its desktop computer [CW, Jan. 16].

Oracle, based in Belmont, Calif., said that Oracle Version 6.0 is one of the first major software product releases for the Decstation 3100, a reduced instruction set computing (RISC) workstation that runs DEC's Ultrix operating system.

At the show, DEC announced that it has developed a new version of the Ultrix kernel that is said to boost the performance of DEC's RISC-based computers, particularly for time-sharing, server and I/O-intensive applications.

The new kernel was released as Ultrix-32 Version 3.1 and Ultrix Workstation Software Version 2.1.

Also at the show, AT&T said a new, fully documented version of the object-oriented C++ programming language — AT&T C++ Language System, Release 2.0 — will be available by the end of this month.

Also, AT&T and Sun Microsystems, Inc. announced an agreement concerning the Open Look graphical user interface. AT&T and Sun will each incorporate the other's Open Look interface tool kits into their source code products, providing developers with a choice of tool kits.

486

FROM PAGE 1

garnered 37.8% of units shipped for 37.9% of 386 PC market revenues.

Last month, Compaq widened the technological gap and shot past IBM by rolling out its 33-MHz 80386-based systems, which can reportedly achieve up to 8 VAX million instructions per second (MIPS) of computing power.

By comparison, an I486 is expected to offer performance comparable to 15 VAX MIPS, providing raw horsepower comparable to superminicomputers and low-end mainframes when running at 25 MHz.

At Comdex/Spring '89 in April, IBM demonstrated the 25-MHz I486 housed in a demonstration version of a PS/2 Model 70 A21 that flashed complex images such as Impressionist paintings on a terminal screen with crystal-clear resolution.

Sources said Tuesday's offering will include only the add-in I486 daughterboard, which plugs into the system's planar board. Other IBM PS/2 system CPUs are directly mounted to the planar board. The I486 daughterboard will replace the 385 memory cache controller, the 386 processor and a 387 math coprocessor, according to an IBM source.

The I486 is crucial to IBM because it gives users workstation performance on their PS/2s, as well as running software developed for IBM Personal Computer XTs and ATs and PS/2s but much faster than it runs on the 8088, 80286 and 80386 CPUs. The most striking difference between the I486 and the 386 is that the I486 contains a built-in math processor and memory cache controller for frequently concurring instructions, much like reduced instruction set computing technology. This design allows the I486 to run 2½ to three times faster than the 386, and three to four times faster on floating-point operations, according to Intel officials.

Entry Systems Division President James Cannavino indicated at Comdex/Spring '89, that IBM would be shipping systems and bus masters based on the I486 by the first quarter of 1990. An Intel spokeswoman said the I486 is on schedule and will be available for demonstration models in the third quarter and in volume production in the fourth quarter of 1989.

IBM has not yet scheduled an introduction of systems based on the 33-MHz 386 processor, a knowledgeable source told *Computerworld*. Other sources said IBM intends to bypass the 33-MHz 386 processor completely, as its PS/2s are fine-tuned to run at 25 MHz. Initial prices for I486-based systems are expected to fall in the $9,000 to $20,000 range, according to International Data Corp., a Framingham, Mass.-based market research group. IDC said the I486, when supporting users in a true multiuser, multitasking environment such as local-area network servers, will allow sites to bring their computing costs down to $2,000 per user.

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DEC, HP team up with plan to extend Apollo technology

BY ELISABETH HORWITT
CW STAFF

BALTIMORE — Digital Equipment Corp. and Hewlett-Packard Co.'s Apollo division announced plans last week to develop a more robust, system-independent version of Apollo's Remote Procedure Call (RPC), which they then plan to implement on their own systems and propose as an Open Software Foundation (OSF) standard.

The two vendors announced the following planned enhancements for RPC, currently part of Apollo's Network Control System (NCS):

- Support for wide-area networks. The current RPC was designed for local-area networks and cannot make connections over to a remote link, said Gail Daniels, DEC's director of LAN marketing.
- The ability to handle larger, more complex data processing applications. The current RPC can only handle a limited number of "arguments," or instructions for which data elements to access, according to Apollo senior product manager Saul Marcus.
- The ability to manage network and system failures. The enhanced RPC will be able to support server recovery and client rebinding after a crash, for example, Daniels said.

The University of Iowa's College of Engineering, which currently uses Apollo's NCS, is interested in all of the RPC enhancements, according to Director of Operations Douglas Eltoft. The college would like to use RPCs to access supercomputers over Internet, the research network that is due to migrate to Open Systems Interconnect protocols over time, Eltoft said.

The enhanced RPC will also address NCS' inability to let an initiating program know that a failure has occurred, a critical feature for transaction processing "when we're collecting data back from several sites," he added.

A more robust RPC is just what DEC needs to support distributed applications on its VMS systems, as well as on the Network Application Support system it co-announced more than a year ago with Apple Computer, Inc., said Peter Schay, program director of small computer systems at Stamford, Conn.-based consultancy Gartner Group, Inc. If DEC and Apollo's RPC is accepted by OSF, it should make that organization's Unix platform more commercially viable, he added.

DEC and Apollo plan to implement the enhanced RPC on their network and operating systems (both Ultrix and VMS for DEC) during the next year. They will also provide support for OSI transport protocols.

HP's acquisition of Apollo will not interfere with the two vendors' development work or with HP's own strategy for implementing Apollo's distributed networking products, said Edward Muns, HP's general manager, Information Networks Division.

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DBMS under PC spotlight

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — Host-style database management systems for personal computers will be center stage at this week's PC Expo here. Along with three other products, Oracle Corp. will announce its long-awaited OS/2 Server, based on Oracle Version 6.0, and will rally key vendors that will develop front-end products.

This cast of Oracle products is similar to the one dragged out to support other servers, including IBM's OS/2 Extended Edition and the Ashton-Tate Corp./Microsoft Corp. SQL Server. Heading the roster will be Borland International, which will demonstrate Paradox working with the Oracle server, and Lotus Development Corp., which will show off 1-2-3 Release 3.0, a spokesman said. Among the 30 or so participants will be Dataease International, Inc., Revelation Technologies, Inc. and Symantec Corp.

Oracle will offer four PC-based servers. It will support OS/2, Unix/386, which is available from a variety of vendors, Banyan Systems, Inc.'s Virtual Networking Software (Vines) and Novell, Inc.'s Netware 386. OS/2 and Unix/386 versions should be available by this fall, the Vines version is planned for next month, and Netware 386 for next year.

Oracle rival Informix Software, Inc. is set to announce that its line of PC DBMS tools that take advantage of extended memory will run on MS-DOS-based networks. Informix will offer a sneak preview of its OS/2 version of Wingz, an Apple Computer, Inc. Macintosh spreadsheet with impressive graphics capability.

On the hardware front, Pan Overseas Technology Corp. will release an Intel Corp. 80386-based computer with a built-in uninterruptible power supply.

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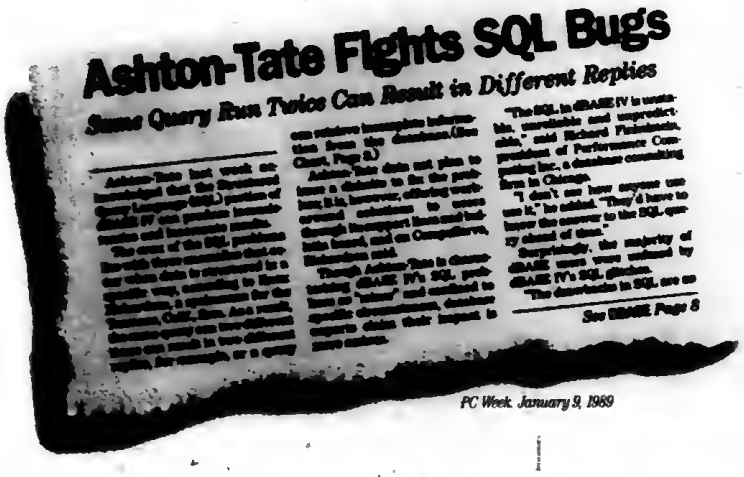

Ashton-Tate Flights SQL Bugs

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PC Week, January 9, 1989

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Northwestern University to start AI lab

BY ELLIS BOOKER
CW STAFF

CHICAGO — An artificial intelligence laboratory devoted to educational applications will be created at Northwestern University here with the backing of Chicago-based Andersen Consulting, the two will announce today.

Andersen and Northwestern will unveil the Institute for Learning Sciences and will name as its first director Roger C. Schank, the former director of Yale University's Artificial Intelligence Project.

Andersen Consulting, the information technology consulting group inside Big Eight accounting organization Arthur Andersen & Co., will fund the project with at least $2.5 million yearly for a minimum of the next five years. Andersen will also supply the Institute with 10 full-time employees.

Plans call for the lab, which will be located in the Northwestern University/Evanston Research Park in Evanston, Ill., to have a staff of 50 people next year and more than 100 by 1995.

Northwestern declined to specify the amount of its funding of the project, although a university spokesman called it "substantial" and said the lab "will put Northwestern on the map in AI."

The lab will address three areas — artificial intelligence, cognitive science and education — and will produce software tools for training and teaching in both educational and commercial settings.

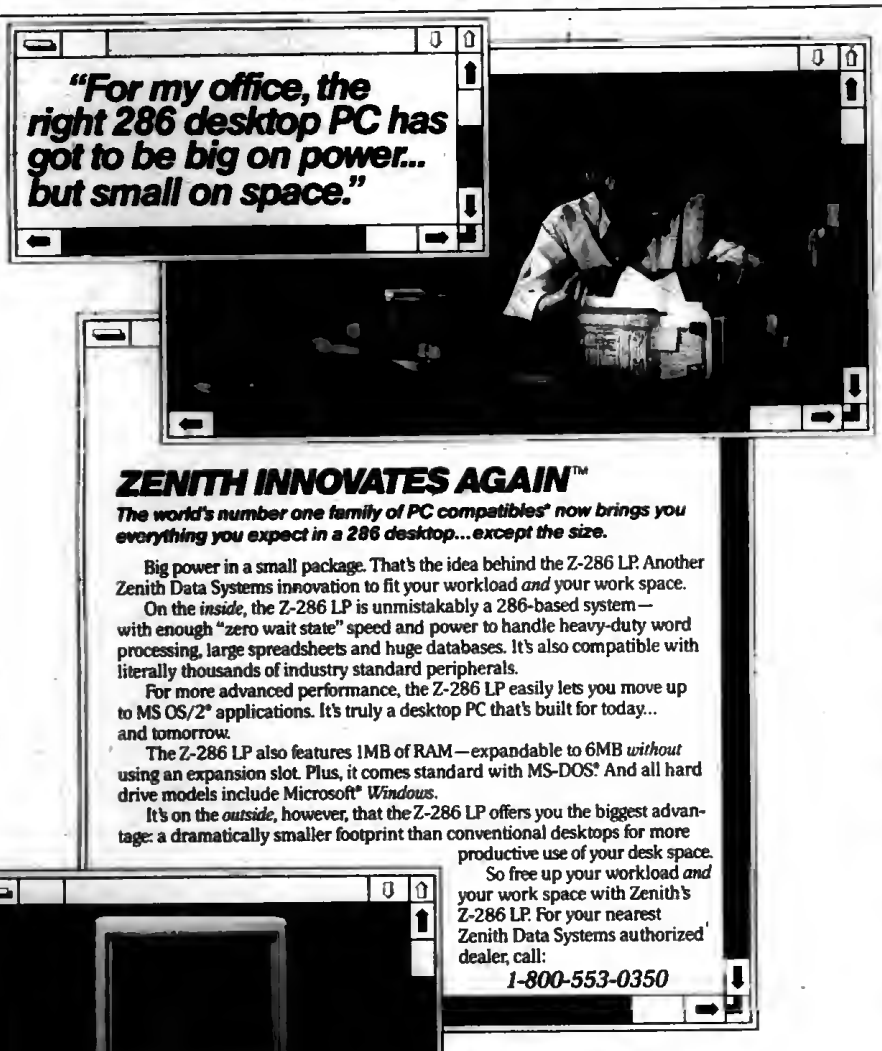
Learning links

"This is an unusual attempt to link research on learning done in artificial intelligence and cognitive psychology with educational software," said George T. Shaheen, managing partner of Andersen Consulting, in a prepared statement.

For its involvement, Andersen will retain exclusive licensing rights to technology that is developed at the institute but not directly funded by another organization.

In addition to Andersen, other public and private backers for the institute's research and development efforts are being sought, according to a Northwestern University source.

In a rare, multitenure appointment, Schank will join Northwestern as a John Evans Professor of Electrical Engineering and Computer Science but will also be named a Professor of Psychology in the College of Arts and Sciences and a Professor of Education and Social Policy, in the School of Education and Social policy.



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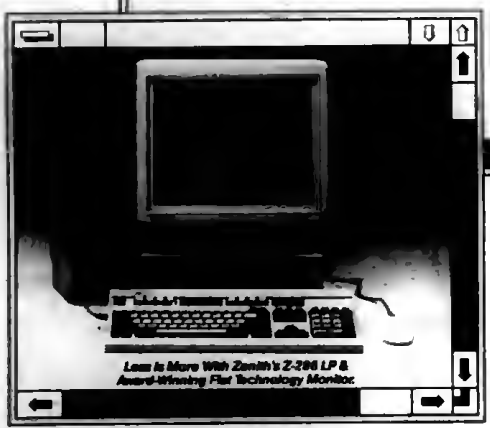

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European firms chisel plan for telecom unity

BY ELISABETH HORWITT
CW STAFF

Spurred on by what they see as a lack of tangible progress toward the 1992 ideal of pan-European telecommunications services, information systems managers from 19 of the 22 European telephone companies met recently to hammer out an initial plan for accelerating that effort through cooperative systems development. The group's name is Istel '92.

"Cooperation among PTTs and telcos is a necessary component of the European single market of 1992, and Istel '92 bodes very well for cooperation," said John Spackmann, MIS director of British Telecommunications PLC. "Now, we [IS people] need to make a smooth link with cooperation programs on the operations side."

Last week in Versailles, the group officially released a plan for cooperative systems development in 10 major areas. The plan placed a high priority on one-stop shopping: the ability of one European carrier to supply a multinational customer's full-service needs, even when other Postal Telephone and Telegraph organizations (PTT) are involved. Among the development areas targeted are the following:

- Support of industry standards, particularly electronic data interchange and Open Systems Interconnect FTAM for interconnecting PTT services.
- Interadministration accounting, with a consistent billing procedure that would enable PTTs to bill for services that they did not directly provide.
- An international directory to support communications among different PTTs' users.

The group identified network management and security as tough areas to address. Cited during the meeting was a recent Coopers & Lybrand report that concluded that a satisfactory level of security in Europe would be "difficult" to achieve.

The group also concluded that because all participants have different types of network management systems, "there is no need for, or possibility of, cooperative work" except among a few PTTs.

Raymond Boult, a Paris-based technical writer, contributed to this report.

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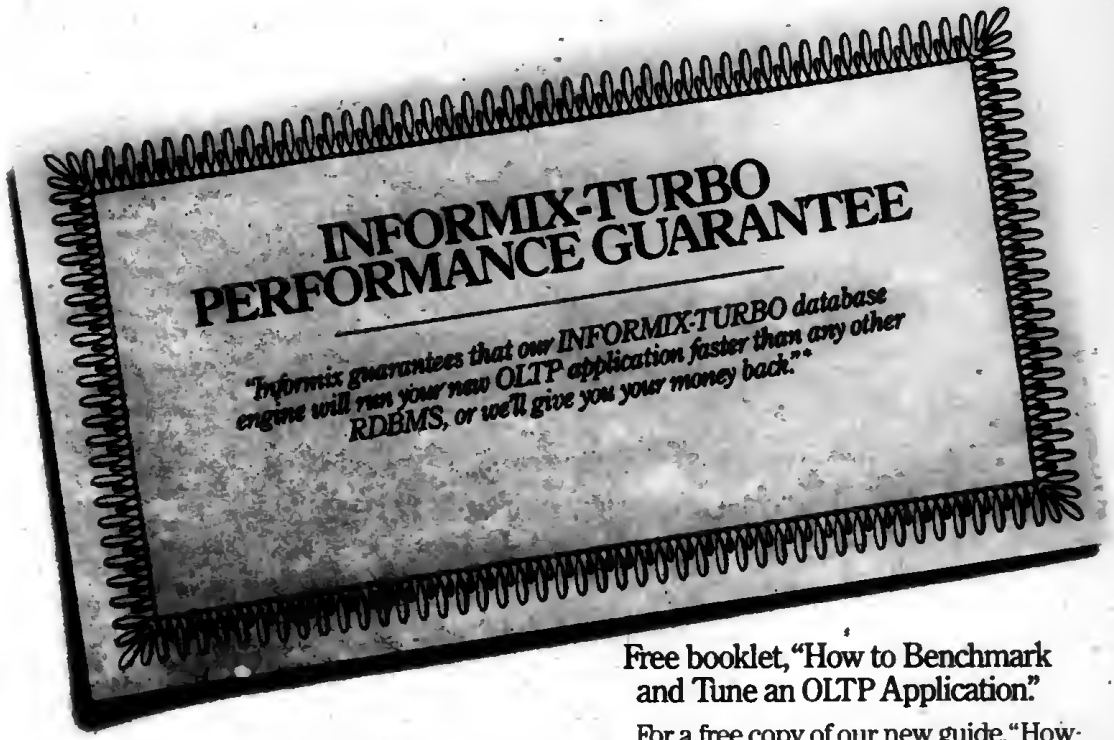

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MSA announces EIS starter kit at a 'smart' price

BY ROBERT MORAN
CW STAFF

NEW YORK — In an effort to pump new revenue into the company, Management Science America, Inc. last week introduced a starter kit for executive information systems (EIS) that will tie into the company's mainframe applications.

The software, called Smartview, resides on the workstation under IBM's Systems Application Architecture and offers the look and feel of IBM's Common User Access. It was designed to provide corporate executives with information gleaned from MSA's mainframe-based general ledger, human resources and manufacturing and materials management software at a significantly lower price than other EIS strategies.

John Dunkle, vice-president of Workgroup Technologies in Hampton, N.H., characterized Smartview as a good interim step for MSA. "It provides functionality that is not common in the market today," he said, "and MSA will do fairly well with it."

Dunkle, however, said users "aren't yet looking for that functionality" and that new competitive technologies will emerge by the time the MSA product gains user acceptance.

Peter Kastner, vice-president at the Aberdeen Group, a consultancy in Boston, said, "The number of companies using executive workstations are few and far between." He added that the EIS products are waiting for a market to catch up to them.

Smartview, however, is not a plug-and-play alternative. Like other EIS systems, it requires time and planning expertise, analogous to building an expert system. Nevertheless, while EIS systems can cost as much as $1 million to implement fully, the MSA alternative can start at approximately $100,000, which includes the cost of software and consulting services required to build the EIS applications.

The first application, general ledger, is scheduled for delivery in the fourth quarter of this year. msa claimed that the human resources, manufacturing and materials management software will be available sometime next year. Each will cost $50,000, the company said.

Call it robust

Smartview is part of a joint agreement between MSA and Comshare, Inc. in Ann Arbor, Mich., the developer of the Commander EIS, which is a more robust system that extracts information from almost all databases residing on IBM mainframes. Comshare will share installation responsibilities with MSA.

"Smartview offers a big chunk of Commander functions for $50,000," said Richard Crandall, president of Comshare, Inc. "While it is limited, you can definitely get going, and we are going to find out what a $50,000 EIS means out there."

However, Crandall estimated that about 35% of Comshare's customers are already MSA customers. One of the 35%, an assistant vice-president in charge of IS for a large East Coast firm who requested anonymity, said, "There are positive sides to the announcement for certain companies that don't have a substantial budget or the technological expertise to match and marry both products." The executive said the return on investment is not easy to assess, but his own implementation, which accesses MSA software and numerous other data, paid for itself in about three years.

Smartview will carry two of the most important Commander applications: an electronic briefing book and the ability to dynamically browse through information using such tools as the touch screen and mouse. The full Commander workstation, which costs roughly $170,000, not including consulting to build the EIS, can access news wires and such public data sources as the Dow Jones stock reports.

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Corporate users eyed closely for piracy

BY ROBERT MORAN
CW STAFF

The Software Publishers Association (SPA) announced last week that it has settled out of court a copyright infringement suit against Facts On File, Inc., a book publisher in New York. The association said it will now broaden the scope of investigations to bring suits against corporate users.

Howard Epstein, president of Facts on File, said the company paid more than $100,000 as a settlement for loading illegal software on the hard disks of some of its office personal computers. The payment includes the cost of attorneys' fees and that of obtaining legal copies of the plaintiff's software.

The plaintiffs represented by SPA, an industry association, included Ashton-Tate Corp., Lotus Development Corp., Microsoft Corp., Wordstar International — formerly Micropro International Corp. — and Wordperfect Corp.

Neither SPA nor Facts On File would discuss how the infringements were discovered, and both claimed that the case was closed. "We've been remiss, made amends and put this behind us," Epstein said.

SPA also announced that it settled out of court a suit filed in April against Cavalier Office Products/Today's Business Computer Center (TBCC), a computer dealer in New York.

The suit charged that TBCC illegally loaded software on hard disks. It was filed on behalf of Ashton-Tate, Lotus, Microsoft and Wordperfect.

The suit was settled out of court and includes a $25,000 payment to SPA and a permanent injunction prohibiting TBCC from infringing on any of the copyrights of the plaintiffs.

The announcement leaves five of 18 cases still pending; the 13 settled so far did not go to trial. However, the first case, filed in March 1988 against The Clone Store, a computer dealer in San Leandro, Calif., is still pending.

According to SPA, computer dealers are the biggest culprits, but SPA Executive Director Ken Wasch said the association will now ferret out illegal usages among corporate users.

Epstein acknowledged that his software use got out of hand and said that companies ought to monitor software usage more closely. Although companies can establish firm policy, they cannot control the software used by employees, he said. "We shouldn't have to watch these people," he said.

According to Wasch, the companies may not have to. Consultants, software developers and the all-but-legion disgruntled employee will do it for them — and already have.

Fresh Clipper reduces time, ups memory

BY PATRICK WAURZYNIAK
CW STAFF

LOS ANGELES — Nantucket Corp. updated its Clipper application development system last week with the release of Clipper 5.0. The firm also previewed its next-generation technology by demonstrating an object-oriented programming system that is portable across multiple platforms.

Nantucket's newest version of Clipper, originally introduced in 1985 as a compiler for Ashton-Tate Corp.'s Dbase, allows programmers to reduce development time and work around the MS-DOS barrier of 640K bytes of available memory.

"Corporations have moved mission-critical applications to PCs, placing great demands on developers to make programs fit within DOS memory constraints," said Larry Heimendinger, Nantucket's president and chief operating officer. Heimendinger addressed nearly 1,000 Clipper developers attending the firm's developer conference here.

Responsibility diminished

The Clipper upgrade, which replaces Version 4.0, offers programmers the ability to develop large applications programs without building overlays, the company said. With Version 5.0, a new link automatically handles the allocation of the program in memory, completely removing that responsibility from the programmer.

The updated Clipper package is priced at $795, a $100 increase over the previous version. Nantucket plans to ship the update Sept. 15 at a price of $195 to owners of any Clipper version.

The next-generation object-oriented programming system also offers version-independent SQL support.

During the demonstration, Nantucket showed multiplatform support with one source-code program running unchanged on DOS, IBM and Microsoft Corp.'s OS/2 Presentation Manager and Apple Computer, Inc. Macintosh platforms.

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PILOT EXECUTIVE SOFTWARE

EDITORIAL

Foreign aid

THROUGHOUT MOST OF this century, the British were world-renowned for their research and theoretical development, particularly in the areas of math and applied physics.

But for a variety of reasons, other developed nations took greater advantage of this basic work than the Brits did. Perhaps this is why the economies of the U.S., Japan and West Germany flourished after World War II while the UK economy languished.

Is the same thing happening to the U.S. today? Are we leading the R&D effort, but to the greater benefit of foreign economic competitors, particularly the Japanese?

That is the implication coming from a U.S. House subcommittee chaired by Rep. Ted Weiss (D-N.Y.). Last week, Weiss' subcommittee spent several hours grilling the president of MIT, charging the school with selling technology — paid for with federal funds — to foreign nations.

Specifically, the government attacked MIT's industrial liaison program, which charges domestic and foreign companies nominal fees to freely access the fruits of the school's high-tech research. This research is largely conducted with federal money. More than half of these companies are foreign, and 57 are Japanese.

The MIT-Japan connection is also seen in the school's vaunted Media Lab. The Japanese provided most of the money to build and endow the Lab [CW, June 12], and of the 15 companies with researchers at the Lab, 12 are from Japan.

With a backdrop of a stupendous U.S. trade deficit and the continuing exodus of industrial leadership in key industries from the U.S. to Japan, the prospect of U.S. tax dollars actually priming the pump of economic calamity is apparently too much for Weiss and his subcommittee.

For their part, MIT officials and other national science policy leaders contend that the U.S. can get back at least as much as it ships abroad in terms of high-tech R&D. But is that really the case?

The answer is no. While the U.S. system of public education is in a pronounced period of decline relative to other developed countries, our university system as a whole is second to none. While congressional saber rattling may encourage more two-way flow of information and research, there simply is more of this information at our end of the pipeline.

Is this cause for alarm or at least for greater scrutiny of government-funded university research? To a certain extent, yes. Government-sponsored research is a cornerstone of long-term economic progress, and the chief benefits of that research ought to be U.S. companies.

In the longer term, however, there is no getting around the fact that the growing commercialization within major universities means that research is available to the highest bidders. Whether the list of bidders is restricted becomes a financial, moral and ethical issue that only the universities can address.

LETTERS TO THE EDITOR

Officevision-ary

I take issue with two of the points mentioned in "Officevision plan hinges on LANs" [CW, May 22].

On a purely cost-effectiveness basis I don't see the demise of the 3270 terminal soon. Why would a business use a $4,000 local-area network-connected personal computer to do data entry or answer questions when you can use a $400 3270 terminal? The point is, a cost-effective configuration is designed based on what the applications command. The "analysts" making this prediction are probably the same ones predicting the year of the LAN. They neither have to pay for it nor support it.

Second, the Intel Corp. 80286 processor is not limited to 640K bytes of memory. It is limited by the operating system, for which OS/2 is a solution. Further, the 80286 has plenty of power for most applications today, and the IBM PC AT bus is far from dead: it is probably just hitting its stride and at extremely cost-effective pricing.

Officevision appears to be a solid direction, and I am sure IBM expects that it will be the value-added product that users will buy into to move to OS/2 and host-connected Token-Ring LANs. High cost and a scarcity of applications are well-publicized reasons for current resistance to OS/2.

Add to that the additional costs associated with Officevision, including all of the support and management issues it imposes on an organization, and I see a tremendous cost benefit barrier to hurdle. Seamless operation is a potentially productive marriage between microcomputers and larger host machines, but at what cost? With so many data processing shops under the gun to justify what they are doing now, I can't imagine them taking on this burden any time soon.

Peter Oemichen
State DP Specialist
Madison, Wis.

Price and honor

Patricia Keefe calls on vendors to "Prune the mumbo jumbo" [CW, May 8] and say what they mean. As an example, Keefe uses Wordtech's $50 price hike of DBXL in conjunction with Release 1.3, a major upgrade. Keefe thought we had a good deal of "chutzpah" to state in the headline of our press release that DBXL's price hike was "in honor of a major upgrade." If Ms. Keefe said this in a positive way, we thank her.

If she meant it negatively, we offer the following: Vendors significantly adding to the value of a product are justified in raising the price of that product. Wordtech feels it has significantly added to the value of DBXL.

According to Webster's dictionary, one of the meanings of the word "honor" is to give recognition. Therefore, what's wrong with telling the world we've raised the price of DBXL in recognition of adding significant value to DBXL?

Daniel C. Berkowitz
Manager
Corporate Communications
Wordtech Systems, Inc.
Orinda, Calif.

Look carefully

I am writing in response to the letter from Mr. Don Merz entitled "286 half-life" [CW, April 17]. Selecting a minicomputer to purchase based on the processor chip as the primary criteria is analogous to choosing an automobile by looking only at the engine.

There are many factors that go into the selection process. The processor chip is but one, and in my opinion not the primary criteria. Many users do not now, nor will they ever, require the power of an Intel Corp. 80386 chip. By the time mass-market user-friendly software is available, we will be talking about the 80686 chip!

Before thinking about the processor chip, first determine your needs in terms of applications and available packages. Then and only then can you estimate the required processing power. Once the power estimate is known, an intelligent survey of available systems can be undertaken. I would not hesitate to purchase a solid, reliable, Intel 80286-based system with a proven history over a poorly constructed 80386 microcomputer.

Let's try to stop our blind rush to ever greater power and stop long enough to look at what is really needed. Let's look for user-friendly and user-useful software. The user doesn't care what chip is inside the computer. He cares whether the system can do what he needs.

Eve Fischthal
Vice-President
S&E Business Associates, Inc.
Smithtown, N.Y.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Focus on product marketing

RICK BLUM

Selling computers is easy — easy, that is, when the economy is booming and empire-building MIS managers can justify the cost of almost any purchase.

However, in the face of an economic slowdown and growing scrutiny of capital expenditures by financial overseers, computer companies have found it increasingly difficult to maintain traditional revenue growth. This trend is particularly true for companies selling into established markets.

Even in the hot workstation market, immunity from red ink is not assured. Witness Apollo's recent financial setbacks, which resulted in Hewlett-Packard's successful buyout of the struggling workstation pioneer. What happened to these companies? Why have they not been able to stem the slide? A clue can be found on the organizational chart. See where product marketing falls.

The computer industry blossomed in the 1970s on the back of technological innovation. Engineering geniuses in the lab kept eranking out powerful new products that practically sold themselves to users who hungered for ways to automate everything from payroll to design.

As the industry matured, the same engineering geniuses began looking at the competition. This shift in focus led to a slowdown in innovation as energies turned from the conception of new and wondrous creations to the development of machines that matched the competition. Throughout all this, product marketing performed its traditional function in high-tech companies: smile and say Yes.

Some people will tell you that the role of product marketing in technology-driven industries is to take the products that engineering develops and find ways to sell them. (Don't scoff. I was told to do exactly that by my boss when I was a product manager.)

Others contend that product marketing's role is to find out what it is that customers want and then direct engineering in the development of these products. Both of these views are correct to a degree, but they both miss an important point: Product marketing can't perform either role if it doesn't have the power to implement its ideas.

I worked for a major minicomputer company for five years. During that time, product marketing was alternately an independent entity reporting to the president, a department in the research and development organization, divided among various business groups, reunited under R&D again, split between R&D and sales and, finally, reunited as an independent entity. All of this occurred under a CEO who was reputed to be supportive of marketing's role, having come from that bastion of marketing know-how, IBM.

This CEO had recruited former colleagues to head R&D and sales. The vice-president of marketing, however, was always an internal appointment. Not surprisingly, none of the four who headed marketing during those years had the stature to change product and selling strategies already embedded in the engineering and sales organizations. The irony is that this firm is always identified in the press as "marketing-driven."

Of course, changes in product development were eventually made; they were always the top-down "if we capture only 3% of the market we'll be OK" approach. Is it any wonder that redirection of the firm's resources toward emerging markets was a case of too little, too late? Is it any wonder that this firm is now facing a severe financial crisis?

If you took a survey of product managers working for established computer companies and asked them how they felt about their job, three out of four would probably answer "frustrated." Most had joined marketing with the intention of formulating and implementing long- and short-range product strategies that would meet customer needs and wants.

What these product managers usually found was that, regardless of the soundness of these strategies, their ability to influence engineering and sales was minimal. For the axiom of high-tech decision making is that when push comes to shove, "Go with what got you there."

After all, the thinking goes, without engineering we would not have products to sell, and without sales we could not pay anyone's salary.

And so things went along smoothly for a while for many of these firms — engineering developed whatever was most familiar (or most fun to work on), sales sold to whomever was willing to buy at whatever necessary price, and all the while marketing led the cheering section — until one day someone noticed that revenue growth was declining, as one new product after another had been greeted by users with a big yawn. That someone was usually Wall Street, and when Wall Street notices, cutbacks begin.

ROB TARR

The recent setbacks computer firms have suffered can be attributed in part to their failure to make organizational adjustments that reflect their metamorphosis from small start-up to *Fortune* 500 status. It's fine for a start-up to be driven at first by technology, and later by aggressive sales campaigns, but eventually, if successful in capturing a significant market share, a market-driven perspective is crucial for continued growth.

Marketing must be seen as one of the pillars (along with engineering, customer service and manufacturing) upon which the company is built. This means that the vice-president of marketing must report directly to the president or CEO, on equal footing with the vice-president of engineering. Product planning should be formulated within marketing, not within engineering. Likewise, sales should be an organization within marketing and not a separate entity.

The effect of these organizational changes is to focus plans for future products on the customers' needs, not on technology.

For those high-tech companies that have failed to keep up with the market, it may be too late to effect the necessary organizational changes to get back in the game, as companies such as Honeywell have found out. New high-flyers should be alert to the hazards of growth and plan now to adjust their organizations as they gain market share, otherwise the fate of their progenitors may await them, too.

Blum, a former product manager at a Boston-area computer company, now lives and writes in Carlisle, Mass.

IS execs should be aware of limitations

IBM WATCH

MICHAEL KILLEN

As IS managers ask for assistance in preparing for the business needs of the 1990s, IBM is answering with its version of the future.

IBM's recent introduction of Officevision and its continued advancement of Systems Application Architecture (SAA) indicate that the company recognizes these new IS requirements.

However, these moves also reveal that IS managers who embrace IBM's solutions will have their work cut out for them in addressing areas that the vendor's strategy will not cover.

While SAA provides the framework for the future business infrastructure that managers will require, it is a narrowly defined framework.

SAA encompasses three proprietary hardware families, four operating systems and many software-to-software interfaces. But it is so thoroughly traditional IBM that the firm has not even included its own recently promoted AIX operating system, a version of which will be offered to customers by other computer suppliers that are members of the Open Software Foundation.

IBM's answer to IS' future requirements excludes many existing IBM products. For example, the PC, System/36 and System/38 have been omitted because they lack the functionality for sophisticated growth.

Missing factors

The company has also excluded products that do not have good revenue potential such as the 370/DPPX, which is an important bridge system to the 370 for 8100 customers.

Essentially, IBM is saying it will solve the systems integration problems that must be solved to build the IS infrastructure. But it will limit the integration to its own main line products. IS will have to integrate non-IBM computer systems, and other vendors will have to be SAA-compliant to participate under the framework.

IS managers can expect the IBM sales force to offer products that they are most familiar with — ones that meet their own business needs and interests — and that may not always be best for the user.

For example, because of the great momentum within IBM to sell products based on the System 370-architecture products to large firms, IBM will probably continue to promote the development of the SAA infrastructure on two-tiered, 370 intelligent workstations (IWS)-based systems instead of three-tiered, 370/AS/400/IWS systems.

If IS managers implement image processing, which is best accomplished by locating a server between the mainframe and IWS, IBM may change its two-tier stance. Another factor that runs counter to IBM's strategy is the higher costs (including overhead) of the 370 vs. Application System/400 solution.

If IS managers wish to include advanced office automation in future systems plans, they should recognize two significant parallel media shifts: from paper to electronic media and, within electronic media, a shift from magnetic to optical media.

Astute IS professionals will recognize that IBM has been heavily committed to large-scale magnetic storage; optical storage presents a significant potential threat to IBM's revenue, and the vendor is unlikely to strongly encourage this shift.

In short, IS managers should recognize SAA's limits, including the idea that IBM has products that functionally and businesswise do not fit the SAA structure. They should continue to make their needs known to IBM, but plan for the realities that IBM's product announcements make apparent.

Killen is president of Killen & Associates, Inc. in Palo Alto, Calif. He is also author of the book *IBM: The Making of the Common View*

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MACKE, AUGUST, Fashion Shop, 1913. Photo: State Museum Westphalia for Art and Cultural History, Munster

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SOFT TALK

Stanley Gibson

Cultivating software

Just as early man discovered some plants were good to eat and then began cultivating them, so IBM, having noted the benefits that "wild" software companies can offer, now seeks to domesticate them.

Software vendors are facing key decisions in their evolution. Do they accept IBM's efforts at cultivation and possibly lose their ability to live in the wild, or do they remain in the wild and possibly die? Most vendors are choosing to work with IBM.

IBM is thus becoming a sort of software gardener. Those firms that appear helpful are being fertilized and watered — perhaps even talked to, as plant enthusiasts sometimes do.

In contrast, those software firms that IBM does not see as benign are being weeded out.

A recent example of IBM's giving a treasured specimen an infusion of nutrients is its purchase of a 5% interest in Management Science America. That was just the most notable of a string of investments by IBM.

One software vendor re-

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Inside

- Valdez spill pushed Alyeska's IS capability. Page 25.
- AS/400 antidote more hindrance than help. Page 25.
- IBM's Santa Teresa lab has a new manager. Page 26.

Massive indecision

Will parallel units ever find a place in the sun?

ANALYSIS

BY JAMES DALY
CW STAFF

1986: The year in which massively parallel computers will take the industry by storm.

No? Then how about 1987: The year of the highly parallel system.

Or 1988: Users of parallel computers unite.

Come on, once more with feeling. 1989: The year massively parallel systems will come on like gangbusters. Well, at least the year is not over yet.

The anticipated embrace of massively parallel systems has been as difficult to ascertain as who is in charge in China. While these machines certainly got a big boost in mid-May when Thinking Machines Corp. introduced two more machines that utilize up to 64,000 processors [CW, May 22], it is still anyone's guess when — and if — they will be either the next device to push the envelope of supercomputing or become the Mood Ring of the 1990s.

While the future of parallel machines may be uncertain, no one questions their basic premise. Massively parallel systems work like a beehive. None of the members are very bright or strong individually, but when they are joined together with a unifying task, incredible jobs can be done at lightning speeds.

On parallel systems, data elements do not have to be brought to a central processor to be added or subtracted. Instead, hundreds — sometimes thousands — of microprocessors slice a problem and have each processor work on a small chunk at a time.

Because traditional supercomputers are inherently limited in how fast they can get data from memory, parallel machines — which position memory with each microprocessor — may become a better-performing alternative, often matching the speed of supercomputers at a fraction of the cost.

While it all looks great on paper, the road to a utopia of parallel computing is littered with the carcasses of companies that could not make their ideas fly: Chopp Computer Corp., Culler Scientific and Fifth Generation Computer, as well as others.

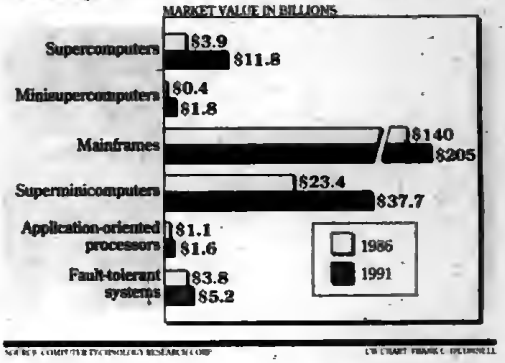
Why? Parallel processing machines have run into a wall of problems that stem from the way they handle their problems, which is far different from the traditional uniprocessor world.

The greatest of these is software. While it is relatively easy to glue thousands of processors together, makers of parallel systems are finding that it is another

Continued on page 28

Parallel tracks

All types of parallel processors are expected to stay on steady growth tracks through 1991



SOURCE: COMPUTER TECHNOLOGY RESEARCH CORP. CW CHART: FRANCIE DONNELL

IBM dangles SMS migration aid

BY ROSEMARY HAMILTON
CW STAFF

IBM hatched a plan earlier this month to take users by the hand and guide them to its System Managed Storage (SMS) concept.

The Custom Migration Support for the Data Facility Storage Management Subsystem (DFSMS) was designed to assist users in tailoring their data for SMS.

The announcement came a few weeks before IBM's scheduled release of a small piece of code that, in effect, acts as a switch to turn on SMS.

At the very least, the migration service will cost $80,000, but it is anticipated that the SMS migration time will be cut in half, according to IBM.

Automatic data allocation

The SMS concept involves hardware, software and procedures that will create an environment in which the system automatically allocates data to various storage elements.

The data is assigned according to its importance and frequency of use. Before that can happen, however, users are forced to structure their data according to a storage hierarchy that prioritizes it. The SMS software will then maintain that structure.

SMS requires plenty of upfront planning because users need to change their perception of storage. In addition, data sets, or files, have to be clearly named and cataloged, a procedure that some users have grown lax about over the years, according to IBM.

A little housecleaning

As a result, many users will be required to redo these procedures for the data sets to participate in SMS.

With the migration service, IBM representatives will analyze a customer's data sets and then be able to determine a priority list for the data.

IPM then supplies the customers with a model that tells them what data should go where in their storage setup.

The concept calls for placing data by priority, with the most important data residing closest to the CPU in expanded storage or cache while the least important data can be stored out on a direct-access storage device.

The user is required to enter the model information in the DFSMS software so that it can automatically allocate data. IBM will then assist the customer in moving the first application to SMS.

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83. Programmer, Methods Analyst
89. Dir. Mgt. Supv. OA/WP
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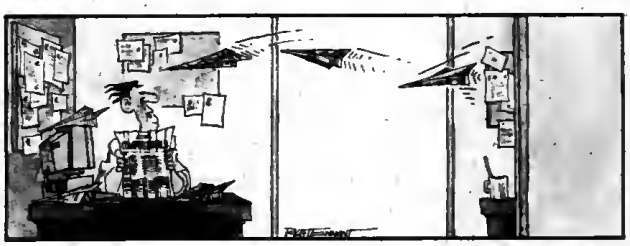

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Pipeline's IS group put to test

ON SITE

BY J. A. SAVAGE
CW STAFF

ANCHORAGE, Alaska — When the *Exxon Valdez* tore open in Prince William Sound in March, tanker traffic in the sound had to be throttled back to keep from spreading the oil and thwarting early cleanup efforts. Not only were the tankers stalled, but because there is no storage available in Valdez, the flow of oil had to be decelerated over 800 miles of two-foot-wide pipe.

"You can't just hit a switch. You have to slowly [throttle] down each of 11 pump stations; it's a complicated process," said Mac McCoy, department manager of Alyeska Pipeline Service Co.'s systems and computers. In the vast tundra there are 11 stations for Alyeska, a consortium formed by oil companies that drill in the northernmost latitudes. Communications between the stations and Alyeska's headquarters here pose problems. Personnel are often out of the pump station and miss phone calls, and Anchorage is one of the few places where Federal Express does not set foot.

The oil spill posed an unusual communications burden for Alyeska because the pipeline, which moves two million barrels of oil a day, is rarely shut off. Headquarters had to get word to the pump stations to take action, and the pump stations in turn had to communicate with one another. "They are so remotely located, we could spend so much time playing telephone tag," McCoy said. "The fact that we had Profs helped. We could use E-mail for communication."

Alyeska's Trimble

Surprisingly, the voice and data lines rarely fail. That is because there are no lines, per se. Alyeska and the local telecommunications company, Alascom, Inc., built a dedicated microwave band. Since Alyeska installed Profs in 1985, the distance and harsh environment have not impeded communications.

The computer room support staff, however, has trouble keeping the air conditioners turned low enough so the computers do not freeze.

Alyeska's IBM 3081 and 3083 mainframes primarily handle materials inventory, materials movement and office automation. Movement and materials is information systems' main function in the company. Alyeska has to be able to locate equipment, such as a turbine, and handle its shipment, because there are no regular freight services along the pipeline. "We can replace and repair [systems and equipment] within three days at every remote station," said Terry Trimble, manager of computing operations at the company. "It's a logistics problem — we only have critical spares, like modems, on hand at the pump stations — but it's handled quite well."

Alyeska's McCoy

IS also keeps track of where the oil is and to whom it is going. That function is complicated by Alyeska's ownership. The seven oil companies all require different daily reporting forms, and Alyeska cannot let one firm know what any of the others are doing, according to McCoy.

Because it is a consortium, the pipeline has no dedicated management. All of the managers are on loan from an owner company. But McCoy swears that their individual IS styles are not foisted on Alyeska. "At times, they have tried to help us, but it turned out that nothing they had was relevant to the pipeline," he said.

Alyeska's IS role was originally expected to decrease as the recoverable oil available from Prudhoe Bay — 9.5 billion barrels — declined. "We thought that with the decline, we would reduce activities and personnel. But there is more work now," McCoy said.

As the pipeline ages, it needs more repair and monitoring. "And then there are things like the oil spill," McCoy said. The spill and a new $25 million construction project — replacing a worn section of pipe in a mountain pass — nudged the CPU work load to its highest point in April — 41,000 transactions per day.

As the company relies more on IS, "IS is becoming increasingly influential in the company," McCoy said, noting that Alyeska, with its growing mainframe complex, is one of Alaska's premier IS shops.

IBM's AS/400 bug cure seen worse than disease

BY RICHARD PASTORE
CW STAFF

MARLBORO, Mass. — Bugs in the Application System/400 operating code are nettling users, but IBM's pesticide is proving to be even more annoying, according to attendees at the Systems 3X Expo here earlier this month.

IBM's Program Temporary Fix (PTF) tapes are intended to correct AS/400 operating system errors, but users at the regional conference complained that installing PTFs is a long, tedious process. Furthermore, defective tapes cause worse problems than ones they were intended to fix, some users said.

Douglas Prescott, president of New England Information Systems in Hanover, Mass., said he had to shut down his business temporarily to install a series of PTFs on his Model B10. The process, which must be constantly attended by a systems operator, required 53 complicated steps.

Users with smaller businesses said they cannot afford to shut down operations for a day every time a new PTF tape comes out — as often as every six weeks for cumulative tapes.

Plans for cranky PTFs

Donald Friedman, IBM director of market strategy at the company's Applications Business Systems division, acknowledged that the PTFs are unwieldy and outlined plans to remedy the problem. "We've got teams working nights and days to make it easier to install fixes," Friedman said. By August, IBM plans to reduce installation steps from the typical 28 to one or two and cut down on the usual eight-hour installation time, he said.

IBM is also planning to offer users the option of applying PTFs more specifically, "so you can fix the problem you have as opposed to all of them," Friedman said.

"There are too many [PTFs], and it takes too long," said Richard Gardner, systems manager at Norton Co., a maker of diamond grinding wheels in Worcester, Mass.

"We're on-line 24 hours a day, so we have to find a holiday and try to install the tapes all at once," said Bruno Smigielski, a programmer/analyst at American Saw & Manufacturing Co. in East Longmeadow, Mass.

Some users said that bugs in the PTF tapes introduced new problems. A PTF wreaked havoc with Smigielski's 2440 tape drive by causing it to run uncontrollably. After installing the PTF, he tried to reload the system from backup tapes, but the drive refused to stop and accept subsequent tapes. "We're a little afraid to use [the PTFs] now," Smigielski said.

A PTF "destroyed" the Remote Job Entry facility on Prescott's machine, he said. "IBM doesn't tell you about the PTF bugs," he added. "You have to call them up. Then they say, 'Oh, there is a problem with that tape.' " IBM sent Prescott another PTF to fix the first one.

An IBM spokesman said that PTF bugs "are not prevalent. The tapes go through a rigorous testing program." But he said if users did not install PTF 1.2, a cumulative tape containing enhancements that was released in November, future PTF installations "could cause problems."

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Furey to pick up pace at IBM's Santa Teresa lab

BY JEAN S. BOZMAN
CW STAFF

SANTA TERESA, Calif. — The silver-colored towers rising from the floor of this California valley south of San Jose are well-hidden from the public highway. Perhaps that is as it should be at this IBM enclave, however, because the strategic software products being developed here often do not come into public view until many years have passed.

The view remains peaceful, but the pace is expected to quicken following the recent arrival of Thomas E. Furey Jr. as assistant general manager of IBM Programming Systems and general manager of the Santa Teresa lab. His arrival came on the heels of the departure of lab directors Morris Taradalsky, one of Santa Teresa's top designers for the data repository project, and most recently, Leonard Liu. However, Furey declined to speak specifically about the status of specific Santa Teresa projects during a recent interview with *Computerworld*.

As director of IBM's Rochester, Minn., lab, Furey pushed the much-anticipated "Silverlake" project out the door as the midrange Application System/400 last year. Now, he expects to make Santa Teresa programmers among the most productive in the software industry. Furey said IBM developers must use computer-aided software engineering tools and artificial-intelligence programs to get more systems products out of the lab and onto the street.

"I fancy myself a leader and a catalyst of change," Furey said. "I want the developers here at Santa Teresa to become the most productive in the industry." Among their weapons in the battle to develop more software, Furey said, will be state-of-the-art CASE tools and fourth-generation languages. To get the job done, he said, "We're going to use internally what we market externally" — namely, off-the-shelf IBM software tools.

Santa Teresa's mission is a broad one. Its 1,800 employees are charged with providing products in the following market areas: the IMS and DB2 database management systems, application development environments, languages such as VS Cobol and Fortran, and knowledge-based systems such as expert systems.

The unique demands of IBM's Systems Application Architecture (SAA) will require extraordinary coordination among multiple IBM sites, including Santa Teresa. But Furey also has responsibility for IBM centers in Cary, N.C., Rochester, Toronto and Bethesda, Md. SAA supports cooperative processing among multiple processors, such as the IBM Personal Computer, the midrange minicomputer and the high-end mainframe.

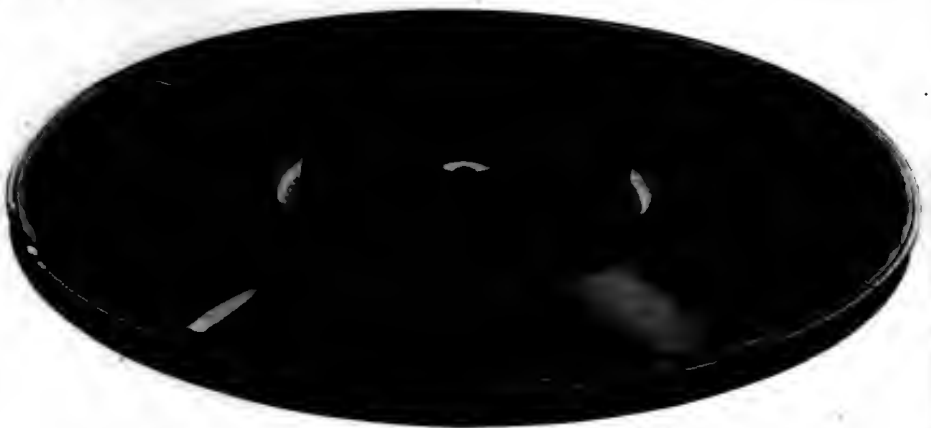
"My job cuts across a number of [IBM] labs," Furey said. "So the directors who work for me try to orchestrate those elements of the SAA strategy for which they are responsible." For example, Furey said, he will be coordinating project management with Edward Altman, assistant general manager for development with IBM Enterprise Systems. DB2 security plans could be checked with Altman, for example, because Altman supervises the development of IBM's security products, including Resource Access Control Facility. Systems Network Architecture changes will be made in the Cary facility.

IBM's Furey *pushed the AS/400 out the door last year*

Furey began his IBM career in 1963 as a systems engineer. Two years later, he moved to IBM's Kingston, N.Y., lab, where he managed the development of mainframe operating systems. Over the years, he managed 21 releases of IBM mainframe operating systems and helped to launch SNA in the mid-1970s. In 1982, he was named technical assistant to current IBM Chief Executive Officer John F. Akers, who was then group executive of IBM's Information Systems and Communications Group.

To make sure things get done in a timely manner, Furey does not plan to travel very far from Santa Teresa, at least in the coming months. He plans to use full-motion videoconference equipment to keep in touch — and on track — with other IBM executives. Frequent plane travel, he said, would detract from his early efforts to shape such key projects as the data repository [CW, March 18] and forthcoming releases of DB2.

S/370 OPTICAL STORAGE



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Unisys to blend systems

BY JEAN S. BOZMAN
CW STAFF

WASHINGTON, D.C. — Unisys Corp.'s Network Computing Group (NCG) is pulling together the multiple versions of systems it sold under the Convergent Technologies, Inc. label prior to its merger with Unisys last year.

In a major strategic shift, NCG is merging its BTOS and CTOS systems into a single system that may soon be renamed CTOS Open. The new operating system will be offered to the software industry as a new multiuser platform alongside Unix and OS/2, Unisys told a meeting of the Convergent Technologies Users Forum here last week.

NCG is expected to announce a single new application programming interface (API) that will converge most BTOS and CTOS applications and communications software by the second quarter of 1990.

The new API is scheduled to be announced at a users' meeting in Paris this week. That API will be the standard for new applications running BTOS and CTOS software, including modified versions sold by France's Groupe Bull in Europe.

Landmark Communications, Inc., a $500 million publishing and broadcasting company in Norfolk, Va., that has 700 BTOS and CTOS machines, is looking forward to the BTOS/CTOS merger. "It was difficult for software developers to commit to CTOS because there were so many flavors of it," said Roland Davis, a Landmark vice-president. "If you have one version worldwide, it should become very attractive." The flavors evolved as Convergent sold its machines to multiple vendors, most of which added extensions to the basic system.

Unisys' moves should help to smooth over differences in applications running on NCG's installed base of 603,300 systems worldwide. "There is a standardization effort, driven by the user community," said Arun Taneja, director of marketing at NCG's Cluster Systems Division. "We're merging all of our systems together, although it will take a few years."

Once those are merged, Unisys intends to tailor its CTOS offerings for different market niches with add-ons. For example, BTOS/CTOS will be packaged with a Posix server for government accounts, Unisys said. Commercial users might find the merged system coupled with IBM and Microsoft Corp.'s OS/2 Presentation Manager or Oracle Corp.'s Oracle/SQL, Unisys said.

Another NCG imperative is to "enfold" DOS to make sales into IBM-compatible shops.

The first wave of the merger, scheduled for the third quarter of this year, will provide common support for X.400 electronic mail, X.25 packet-switched protocols, Transmission Control Protocol/Internet Protocol, IBM's Systems Network Architecture, Ethernet and Token-Ring. By the second quarter of 1990, most BTOS communications products will be available to CTOS users and vice versa, Taneja said.

Taneja said most users want to network their isolated CTOS work groups together for enterprisewide applications, including transaction processing. The advantage of using BTOS/CTOS, he said, is that the Convergent systems' message-oriented design can outperform Unix and OS/2 for some distributed-processing applications.

Unix users get four-tier service

BY ROSEMARY HAMILTON
CW STAFF

BLUE BELL, Pa. — Unisys Corp. recently released a new maintenance plan that for the first time allows users to select the level of service they want and also combines hardware and software maintenance into one contract.

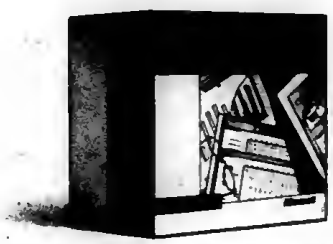
Unisys will initially offer this Surety plan to its Unix customers. By the end of this year, Unisys will provide Surety to its personal computer customers and A series mainframe users, according to George Gazerwitz, president of Unisys' customer service and support division. In early 1990, Surety will be introduced for the Unisys 2200 mainframes.

The Surety plan has four levels of service, starting with basic maintenance coverage that offers phone support for hardware and software problems. Each additional level offers more features, with the highest level of service, called the comprehensive package, offering guarantees for response times, on-site service, replacement parts and software maintenance updates.

Previously, a Unisys customer was required to sign a contract for hardware coverage and a separate deal for software maintenance. Surety combines the coverage so a user's complete system is covered by one contract.

Pricing will be based on the number of systems and the level of service requested. For example, a 5000 series user could pay as little as $65 per month for the first level, called Intro, or up to $475 per month for the comprehensive package,

Stop your soul searching.



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Indecision

CONTINUED FROM PAGE 21

ballgame entirely to get software developers to write for their machines.

Because there is a variety of parallel processing architectures — vector machines employing pipelining and the chaining of functional units, long instruction word machines using multiple functional units and numerous multiprocessor configurations — it is difficult for software developers to focus their attentions.

"Real progress in fulfilling the promise of parallel processing isn't likely to occur until one of these solutions becomes the clear winner," said Omri Serlin, a Los Altos, Calif.-based consultant who produces the "Serlin Report on Parallel Processing" monthly newsletter.

Until then, much of the attention has been focused on recompiling software written for conventional, scalar architectures. This, too, has problems. Compiling can be difficult and tedious, while conventional scalar development and debugging techniques are often ineffective in architectures using a large number of interconnected architectures.

Compiling is often difficult. "What we may eventually need is a whole new generation of programmers writing programs from scratch with the idea that they are going to be run on many processors," said Patricia Laupheimer, vice-president of technology at Shearson Lehman Hutton, Inc.

That, too, may be difficult to achieve in a world in which such giant software organizations as Microsoft Corp. and Ashton-Tate Corp. have difficulty maintaining an update schedule for their current product line.

Additionally, conventional operating systems are not suited to supporting configurations with a large number of processors. If these operating systems treat each task allocated to a processor as a separate user, there is no time left for processing — only scheduling.

An emerging solution to this problem is the concept of lightweight objects, or subtasks that share resources allocated to the main process, thus allowing more rapid scheduling. Convex has begun to offer such capabilities in its C2 line of tightly coupled vector processors.

Another concern that must be addressed if massively parallel systems are ever to reach substantial commercial inroads is ironing out the problem of data coherency, or making sure the processors inform one another when they have changed or located data.

Unfortunately, there is no guarantee any of these solutions will clear all of the stumbling blocks. "The word 'must' doesn't necessarily make things happen," said Charles Casale, president of the Aberdeen Group, a market research firm in Boston. "But they'll always be a market for specialty machines, which is where I believe these machines are destined to remain. Their challenges are just too formidable."

What is clearly needed is less hardware exploration and more solving of the software development problems. IBM and Digital Equipment Corp. already have parallel Fortran versions, Indiana University is developing the Sigma system of parallel development tools and NCube has announced that it will be porting Oracle Corp.'s popular DBMS over to its new machines this week. .

Gibson

CONTINUED FROM PAGE 21

cently acknowleged that his firm may be being "fattened up" for a feast by IBM. But, be asked, what choice was there?

Plants that grow too well could become a target for the pruning shears. Cullinet, for example, by selling IDMS/R over the years, may have brought many hardware sales to IBM. Now, even after a successful DB2 campaign, IBM is still trying to drain off Cullinet's user base by staging promotions to get people to convert from IDMS to DB2.

In addition, Cullinet makes computer-aided software engineering (CASE) tools. Do you think they are in the inner circle of those CASE vendors that are working with IBM on the repository project? No. How about Oracle, also a vendor of CASE tools? No. That is because Oracle is mainly a relational database management system prodigy. Oracle and Cullinet are both five to 10 times larger than the companies — such as Index Technology — with which IBM is working closely.

The difference in treatment is not lost on the companies involved. At a recent meeting between software vendors and IBM, Cullinet's John Landry reportedly voiced his discontent with IBM's selective breeding process. A number of smaller CASE vendors are also resentful of IBM's tendency to choose favorites.

The issue resurfaced recently when IBM invested in Management Science America, Inc. I suspect there was plenty of outrage at MSA archrival McCormack & Dodge. Should M&D have been surprised by IBM's move? MSA is workingon its development for IBM systems only, while M&D is doing a fair bit of work for Digital Equipment Corp. systems.

Could IBM's move been as much a reaction against M&D's advocacy of DEC as it was to assist MSA?

Although IBM seeks to portray itself as fostering growth for growth's sake in the software world, IBM will never be able to put aside its self-interest. Once a software vendor has had its best years, it could become the victim of crop rotation.

Gibson is *Computerworld's* senior editor, software.

UNIX,
UNISYS
AND YOU.

NEW PRODUCTS — SOFTWARE

Database management systems

On-Line Software International, Inc. has announced software designed to analyze, maintain and tune IBM DB2 software systems.

Called Proalter/Plus, the package reportedly allows DB2 database administrators to use ISPF-like panels to view and modify DB2 objects and optimize DB2 application performance. The database utilities can be submitted on a DB2 object or another object and all of its dependents, the vendor said.

Proalter/Plus costs $25,000. Twelve- and 36-month lease plans, multicopy discounts and corporate licenses are also available.

On-Line Software
Fort Lee Executive Park
2 Executive Drive
Fort Lee, N.J. 07024
800-526-0272

Oracle Corp. has announced the availability of its Oracle relational database management system for Wang Laboratories, Inc. VS computers.

Oracle products for the Wang VS platform will include Oracle RDBMS Version 5.1, SQL*QMX, SQL*Net for Wang Information Systems Networking and Oracle precompilers. Prices depend on CPU size and number of users.

Oracle
20 Davis Drive
Belmont, Calif. 94002
415-598-8000

Schumann Consulting Group, Inc. has announced Data Base Control (DBC) Release 4.0.

The software reportedly monitors the space, pointers and performance of IMS or DL/1 database operation in IBM MVS or MVS/XA shops running IMS DB/DC or CICS. DBC inspects the databases and reports to the database administrator on those that require corrective action, the company said. Enhancements reportedly include performance and space-usage analysis capabilities. A perpetual CPU license is available for $30,000.

Schumann Consulting Group
333 Sylvan Ave.
Englewood Cliffs, N.J. 07632
800-533-9103

Development tools

Netron, Inc. has simultaneously released Version 2.04 of its Netron/CAP software engineering systems for six micro, mini and mainframe development platforms, including systems offered by IBM, Digital Equipment Corp. and Wang Laboratories, Inc., the company said.

The product is targeted at personal computer-based mainframe application developers and reportedly offers enhancements to all seven of the software's target platforms for portable Cobol applications, including IBM CICS and IMS mainframe environments. The latest release includes enhanced debugging functions and a cross-reference system for impact analysis.

Netron/CAP Version 2.04 is priced according to the chosen combination of development and target environments and the number of licensed terminals. Licenses start at approximately $50,000.

Netron
99 St. Regis Crescent N.
Toronto, Ont., Canada M3J 1Y9
416-636-8333

California Software Systems, Inc. has announced that it has developed a personal computer-based software system that reportedly emulates the IBM System/36 environment of the IBM Application System/400.

According to the vendor, AS/400 minicomputer users running RPG-II applications in the System/36 environment will be able to run the same application on Intel Corp. 80286- and 80386-based personal computers and local-area networks. The product is called the Babyu Application System for the AS/400 and is reported to be the first in a series of three software releases designed to replicate the enhanced RPG environment of the AS/400.

Pricing begins at $4,000 for standalone PCs.

California Software Systems
525 N. Cabrillo Park Drive
Santa Ana, Calif. 92701
714-973-0440

Applications packages

Trax Softworks, Inc. has announced Edword 2.0, a word-processing package that supports IBM's MVS/XA and MVS/ESA mainframe operating system.

The latest version provides the ability to operate at higher than 16M bytes for large documentation requirements, the vendor said.

The software reportedly permits users to create documents and reports such as annual reports, registered stockholders' lists and software user documentation in a mainframe environment. A perpetual license for Edword ranges from $6,500 to $11,500, depending on which CPU is used.

Trax Softworks
10801 National Blvd.
Los Angeles, Calif. 90064
213-475-8729

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MICRO BITS

Douglas Barney

A few nice words . . .

More than a few of my favorite things. Regular readers of this column could conceivably view vendors as the whiniest group of losers ever hatched. But they really aren't so bad. Sure, they can be price gougers and deceitful, but they often create excellent products and occasionally even listen to customers.

If it weren't for vendors, we would have very few technical advances, fewer competitive battles that create better products and nobody to make fun of.

Most vendors do not understand why we bash them so. Here's the answer: There is an inherent conflict between those that sell products and those that buy them. Buyers want products cheap. Sellers want them expensive. Buyers want products to work. Sellers just want them sold.

This newspaper happens to represent buyers. If we were *Vendorworld*, I'm sure we'd have plenty of articles about the perils of the long sales cycle and nit-picky buyers that squeeze margins and demand the world.

Despite this conflict, there is frequently a common ground,

Continued on page 38

Upgraded Windows opens onto new vistas

ANALYSIS

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — On the eve of Presentation Manager applications delivery, Microsoft Corp. zealously presses on with its mission to establish and enhance Windows.

Later this year the firm will launch Windows 3.0, its biggest upgrade ever, which is expected to overcome its greatest barrier: the dreaded 640K-byte limit. This is also one of the key selling points of OS/2 Presentation Manager, which will itself gain applications beginning this summer and stretching into the rest of this year.

Meanwhile, vendors — particularly mainframe software houses and IBM — are preparing cooperative processing-style Presentation Manager applications. This, along with the dramatic new capabilities of Windows, has turned a formerly segmented market into one of overlap and confusion.

Windows 3.0, often demonstrated but not yet announced, is expected to vault Windows directly into OS/2 and Unix large-memory territory. Furthermore, the ability to run in a so-called protected mode (i.e., with direct access to 16M bytes of random-access memory) has caused some key personal computer vendors to reconsider their previously harsh feelings toward Windows.

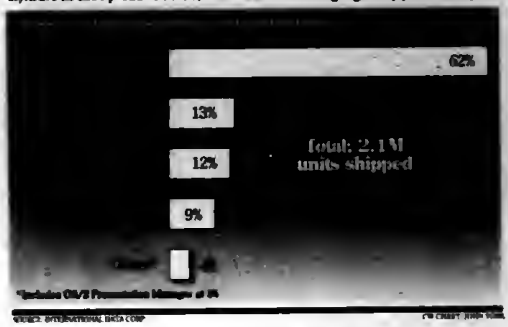
Microsoft always maintained that Windows would remain a "real mode" or 640K-byte product; therefore, Windows 3.0 caught many by surprise. For most, however, the experience has been pleasant.

Nevertheless, the similarities between Windows 3.0 and Presentation Manager are apt to confuse users. "The only thing OS/2 has that 3.0 doesn't is multithreading," said Carole Patton, editor and publisher of "Ac-

Continued on page 38

Windows opens lead

Microsoft's Windows maintains its dominant position among PC windowing software as such products as OS/2 Presentation Manager gear up for market push



Sun, Toshiba 'sparc' low-end battle

BY MICHAEL ALEXANDER
CW STAFF

The recent pact between Sun Microsystems, Inc. and Toshiba Corp. to build Sparc workstations signals that the Sparc-compatible market is gaining momentum; it also foreshadows an intense battle for the low end of the workstation marketplace, according to industry observers.

Last month, Sun and Toshiba signed an agreement that will permit Toshiba to develop low-cost workstations using Sun's Scalable Processor Architecture (Sparc) microprocessor architecture and SunOS Unix operating system. Toshiba will include Open Look, the graphical user interface developed by Sun and AT&T, with its computers. The company said it planned to have the first of its Sun Sparc clones on the market early next year.

In April, Sun introduced three workstations — the Sparcstation 1, Sparcstation 330 and Sparcstation 370 — based on its own reduced instruction set computing microprocessor. Sparcstation 1, priced at $9,000, fueled the company's push into the low-end workstation business.

Solbourne Computer, Inc. announced recently that it had pared the prices of its Series 4/600 and 4/800 desktop models, which the company calls "Sun-4 compatibles," to make them more competitive with Sun's machines.

Others join in

Solbourne also recently introduced two Sparc-compatible file servers, the Series 4/530 Workgroup Server and Series 4/670 Departmental Server.

Several other companies are expected to introduce low-cost Sparc clones in a price range of $5,000 to $10,000 within the next few months. Sun has been encouraging other vendors to build compatible versions of its workstations, a tactic that could backfire as competition intensifies, according to David Card, an analyst for International Data Corp., a Framingham, Mass.-based market research firm.

Inside

• Lotus' Magellan will search the world to successfully locate a file. Page 37.
• Users say Foundation-ware's Certus is a Doberman of a security watchdog. Page 37.

First COBOL Presentation Manager Application! See It At PCExpo/CASECON

Micro Focus, the company that introduced COBOL to the PC, will be giving an advance peek at an exciting breakthrough for COBOL and COBOL application developers. Micro Focus will be showing a sample Presentation Manager application developed entirely in Micro Focus COBOL/2 using its powerful new extensions to the COBOL syntax.

At the same time, Micro Focus will be showing the SQL support to be embedded in the COBOL/2 compiler and several other features that will change the way programmers think about COBOL.

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III

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SMALL TALK

Michael Alexander

Pomp, circumstance and a virus

One of our regular readers called last week to alert us to be on the lookout for college students carrying viruses.

The caller predicted that businesses that choose their new employees from this year's crop of college graduates will get hit with computer viruses to boot. The big idea is that viruses are running rampant on college campuses, and college students — being, well, students — are apt to take with them illegal copies of favorite programs when they leave campus. The caller said the real problem — beyond the software copying issue — is that these pilfered programs will as likely as not be infected with viruses.

Computer viruses are a fact of life on college campuses, the caller pointed out. They even named one of the more insidious viruses after Lehigh University. From campus to corporate computer system is only a short leap of the imagination, our reader warned us.

At the same time, it's also quite a stretch of the imagination. College students are guilty of a lot of sins but certainly no more than anyone else. In any event, compared with some of the rowdies that I used to run with in the late '60s and early '70s, today's average college student seems rather tame. But if there's a moral here, it is that computer viruses can hit you from any direction, even from a freshly scrubbed recruit who is eager to put into practice what he or she has learned in academia.

It's a real trick to keep employees from inadvertently injecting viruses into the company's computers — more now than ever with the extraordinary popularity of personal computers and local-area networks. One place to start, though, would be to prohibit employees without exception from using their own software on the company's machines.

It really doesn't matter where the software comes from: Whether it is freeware, shareware or a commercial product, all could carry viruses. Of course, by doing this, you're not

Continued on page 39

Magellan users no longer searching

With indexing and multiple search methods, users say stray pieces of data aren't so hard to find

BY DOUGLAS BARNEY
CW STAFF

Among other promised features, Lotus Development Corp.'s Magellan claims to find a stray piece of information and launch a user into the application that created it. All this is supposed to happen without the hassle of searching through file after file and directory after directory.

False advertising? Not according to early users of the product.

Magellan works by indexing all the files on a user's hard disk. It then allows users to scan files — including batch files — or it can search based on a word, phrase or concept.

Once the relevant file is located, the system can launch directly into the application with the file already loaded. It can also gather pieces from various files and collect them in one master file to create a report or summary.

To top it off, Lotus threw in the ability to copy, move, delete and print files. Users can also resort their files based on size and creation date or in alphabetical order using Magellan menus.

Tom Ferguson, a research and development analyst for the city of Phoenix, said he finds Magellan, which has been available since April, a bit addicting. He said he enjoys the file scanning capability, which allows him to view the contents of files as they scan through a directory.

Eureka!

Ferguson also said he found that Magellan fills much of the bill as a personal information manager, allowing him to find random bits of information that otherwise would be lost.

According to Ferguson, the product will probably see broad use within the city of Phoenix' municipal government.

One application under consideration is to set up a system to retrieve and peruse city rules and regulations. With Magellan, a user could simply ask for all the references to firearms, for example, get a list of relevant files and gather them together into one.

Mary Campbell, who has written 16 books about computers and uses a variety of word processing packages depending on which publisher she is writing for, is another Magellan user.

Before that product, finding information was like "a wild goose chase" said Campbell, who founded Campbell & Associates, a consulting firm that focuses on PC training. She had to know what word processor created it, load it and start reading files.

"Now with Magellan, I can do text searches, and it doesn't matter where it is," she said.

Pushing it

In Ottawa, Nigel Chubb is pushing Magellan further than it was designed to be pushed — with good results. Chubb, manager of technology at Canada Post Co., is using the MS-DOS-based Magellan in conjunction with IBM's OS/2 Extended Edition. He uses Magellan in the OS/2 compatibility box to search OS/2 Extended Edition files and reported no problems.

Chubb has become increasingly reliant on Magellan's ability to read multiple file formats and gather pieces of files into one. This is extremely handy, as Chubb is called on to generate reports based on information sent in a variety of ways.

"The product is more profound than a lot of people realize," Chubb said. In fact, Chubb beta-tested the product and, as part of the agreement, removed it from his hard disk once the test ended. "I missed it," Chubb said.

Magellan runs on IBM Personal Computers and compatibles with at least 512K bytes of memory and a hard disk. The system is also aimed at systems that are equipped with compact disk/read-only memory and can contain up to a half gigabyte of data.

The product supports many popular file formats but does not yet work effectively with Microsoft Corp. Windows applications. It also works with ASCII text.

Lotus is currently developing additional viewers for popular applications. These viewers can be added to the system without reloading the software.

Magellan retails for $195.

Certus stands guard at system doors

Large-scope vaccine bars foreign software, detects minute file changes

BY RICHARD PASTORE
CW STAFF

Security-conscious microcomputer users want more than a virus bloodhound; they need a vigilant watchdog and an overall security manager. Early users say they have found such a beast in Foundationware's Certus.

"It has a larger scope than the products focused specifically on a type or strain of virus," said John O'Leary, managing director of Northboro, Mass.-based Computer Security Institute's Educational Resource Center.

Certus, known as Corporate Vaccine when it was announced in April 1988, can restore systems from hard-drive crashes, prevent unauthorized software from being run and detect minute changes to system software. It also monitors and records attempts to run unauthorized software and limits writing to and downloading from the hard drive on which it resides.

O'Leary, who demonstrates Certus along with other security products in educational seminars nationwide, said he is impressed with its monitoring function. The program detects and reports changes made on programs, the operating system, user-selected files and the Certus program itself.

"Anyone looking for [security] products needs to have some feature like that because it's important to see if your environment has changed since the last time you used it," O'Leary said.

Computer Security Institute's O'Leary *is impressed with Certus' monitoring ability*

Tom Hartrich, technical support project manager at beta site Marine Midland Bank in Buffalo, N.Y., described how he challenged Certus' monitoring ability. He changed a single bit of a file, taking care that the file size, date and time were not altered. "It picked up on that one little change," Hartrich said. "We thought that was pretty important."

The product guards against viruses by allowing only software authorized by the systems manager to run, and it tracks and logs attempts to run unapproved programs. According to beta users, these defenses were very difficult to dodge.

"It is not something that the average user can defeat," said George Collins, security consultant at beta site Booz, Allen & Hamilton, Inc. in Bethesda, Md.

"There is no intuitively obvious way to defeat it," O'Leary added.

Crash recovery

Another prominent feature of the program is its creation of a system backup disk during installation that reportedly can be booted up to recover a system from most hard-drive crashes. Certus can also be used to guard against data theft by preventing the copying of hard-disk data to floppy drives.

Certus operates in background, allowing end users to interact with the system and applications as they have done in the past. Hartrich said he appreciates Certus' transparency because when evaluating other security programs, he "had to go through their interfaces, which were very clumsy."

Despite Certus' depth of function, it uses only 5K bytes of random-access memory. However, it consumes 800K bytes of hard-disk capacity, according to Collins.

Installation is simple, Hartrich said. Depending on the hard drive, it can take about 15 minutes and is "very automatic," he noted.

There were some problems with the product, however. Hartrich made suggestions to improve the clarity of the installation procedure and increase the flexibility of some features.

Foundationware implemented these suggestions and also made adjustments so that the program could run in parallel with two of Marine Midland Bank's word processing packages.

The bank has decided to standardize on Certus and received shipment last week of some of the approximately 50 copies that will be installed in offices in New York, Chicago and San Leandro, Calif.

The product runs on IBM Personal Computers, XTs, ATs, Personal System/2s and compatibles running DOS 3.0 through 4.0. Certus retails for a price of $189.

O'Leary and Hartrich are awaiting the arrival of Certus' local-area network version, which is slated for the fall.

The program will reportedly reside on file servers of DOS-compatible, IBM Netbios local-area networks.

Windows

FROM PAGE 33

knowledge," a newsletter for users and developers. Multithreading allows applications to multitask within themselves so that, for example, a spreadsheet can print while another is being created. "Customers are going to question why they should buy OS/2," added Said Mohammadioun, chairman of Windows developer Samna Corp.

For now, Windows 3.0 is 386-specific, but Microsoft has committed to a 286 version, Patton said. According to Patton, Windows 3.0 also features improved network support and new menu types such as floating and hanging menus.

Microsoft advises customers who are focused on packaged applications to move to Windows. Those who are developing internal applications, however, should consider the Presentation Manager, according to Rich Abel, group product manager at Microsoft.

Long and winding road

It has been a long and seemingly endless road for those who hopped into this new world of graphical user interfaces. Certain milestones, however, have been reached. There are now some 500 Windows applications shipping, and Microsoft has shipped 2.2 million copies worldwide, according to Framingham, Mass., market research firm International Data Corp. Key U.S. organizations have made serious commitments to Windows.

Despite these gains, however, several users have maintained that Windows is less attractive than OS/2. "If I want Windows, I'll buy a Mac," said Steve Mullins, a PC specialist at the Krannert School of Management at Purdue University.

"We've brought Windows in to look at, but apart from Aldus' Pagemaker and Micrografx products, there is nothing exciting under Windows," said Gary Wagner, a systems programmer at People's Gas Light and Coke Co. in Chicago.

The mainstream applications drought may change. Holdout Wordperfect Corp. is now "considering" a Windows version, and a high-level Ashton-Tate Corp. source said his firm was about to decide to develop a Windows version of Dbase.

After Apple Computer, Inc. filed suit claiming that Microsoft violated its copyrights, Borland International publicly bailed out of Windows. However, said Paul Steinberg, North Central district manager at Borland, his firm is now reevaluating because a protected-mode Windows would provide room for Paradox, Windows and plenty of data.

Midwest Correspondent Elsie Booker contributed to this report.

Barney

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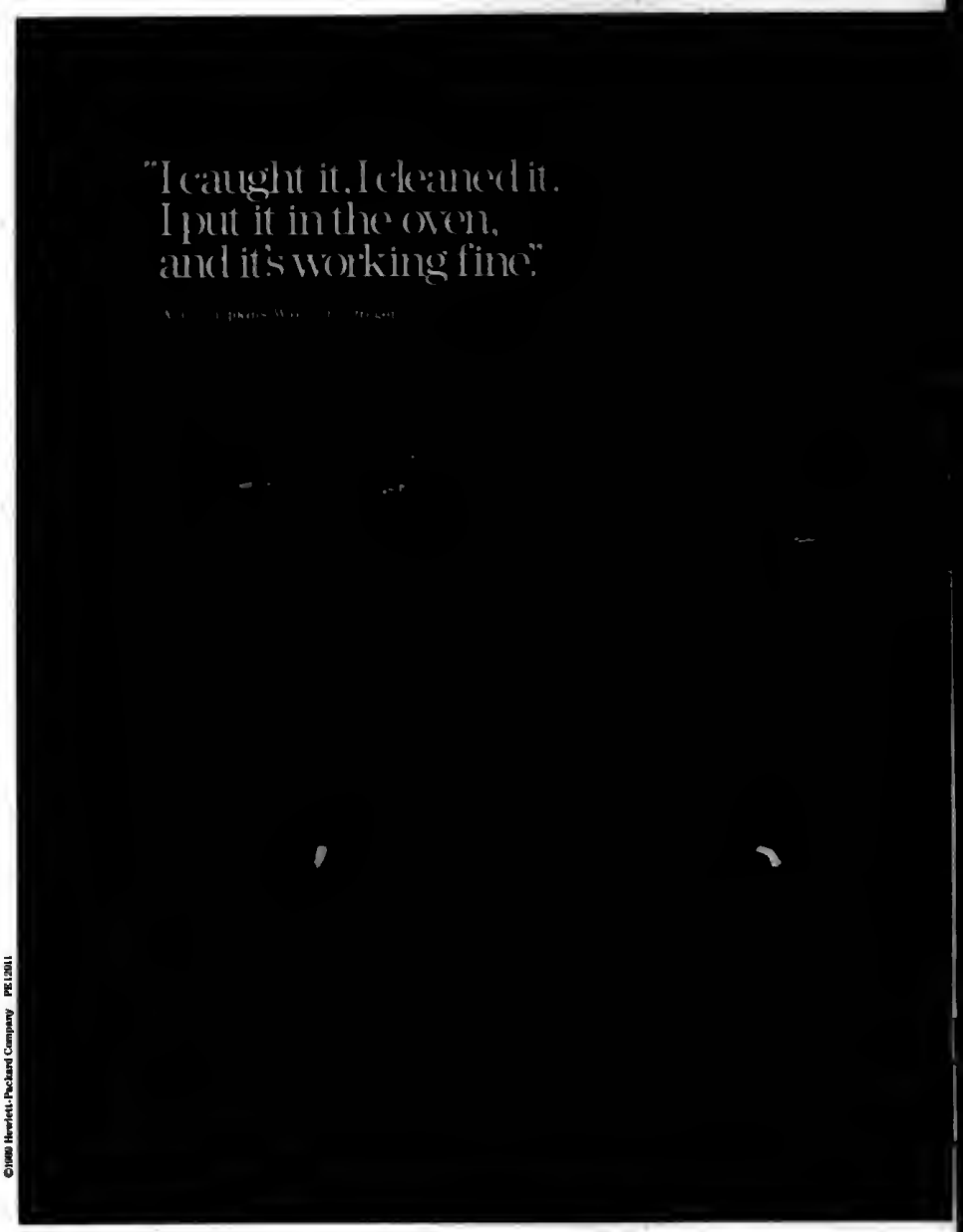
particularly when vendors combine innovation with responsiveness to customer needs. Funny — those are the companies that tend to survive and prosper.

So, in fairness, I decided to rack the old brain and say some nice things about vendors for a change. There will be a minimum of snideness.

IBM: They're big. They're expensive. But when pressed, IBM can produce things that are truly reliable and stand up to years of technical change and abuse. The 370 mainframe family goes back decades, but some of America's most important organizations, including the space shuttle, could not work without them. This beast of a company is not afraid to stick its neck out and take a few lumps. That's class.

Compaq: They're big. They're expensive. But Compaq has proven that high performance personal computers can be compatible and reliable. They've also shown that a firm less than a decade old can garner the same exact reputation as IBM, and that keeps everyone on their toes.

Apple: They're big. They're expensive. But Apple has convinced computer phobics that these devices are okay. They have also pressured IBM into following (albeit years later) Apple's lead in graphical user interfaces. Best of all, Apple has proven that there is nothing healthier in American business



than an interesting alternative to a boring industry standard. And they're fun!

Microsoft: It doesn't seem fair that Microsoft prospered by popularizing one of the most arcane and annoying operating systems ever cobbled. Yet Microsoft has done great things for this industry. It is the only firm that has hurled insults at Lotus that actually stuck, and it is the firm that has put it all on the line to legitimize PC graphical interfaces. Best of all, by relentlessly chasing new technology after new technology (after someone else pioneers it), Microsoft has provided what users desire most: good products.

Lotus: This company is an easy target for barbs. That'a why so many miss the inherent strength that comes from acutely focusing on such IS issues as communications, programmability and multiple platforms. Besides, Lotus' unshipped products are better than most other people'a unshipped products.

Oracle: These guys get away with murder by saying one thing and delivering another. Slapping around Oracle has become a popular pastime among competitors and a select group of analysts. But this overactive firm from Belmont, Calif., has done more to further the causes of SQL, applications portability and distributed databases than anyone else. Plus it has kicked IBM in the pants a few times to boot. For this, it should be recognized.

Barney is a *Computerworld* senior editor, PCs and workstations.

Alexander

FROM PAGE 37

going to win any popularity contests.

If you don't think it is practical or even possible to regulate the software used on the company's computers, then it is incumbent on the personal computer manager or information center to train end users to properly handle software (as well as other security-related issues, of course).

I spoke to a PC manager at a large Midwest university to find out whether he believed that college students are more likely to spread viruses than anyone else. He made a few jokes about students carrying all sorts of unusual ailments but naturally did not think this year's graduating class was sent out into the business world to spread computer viruses like plagues.

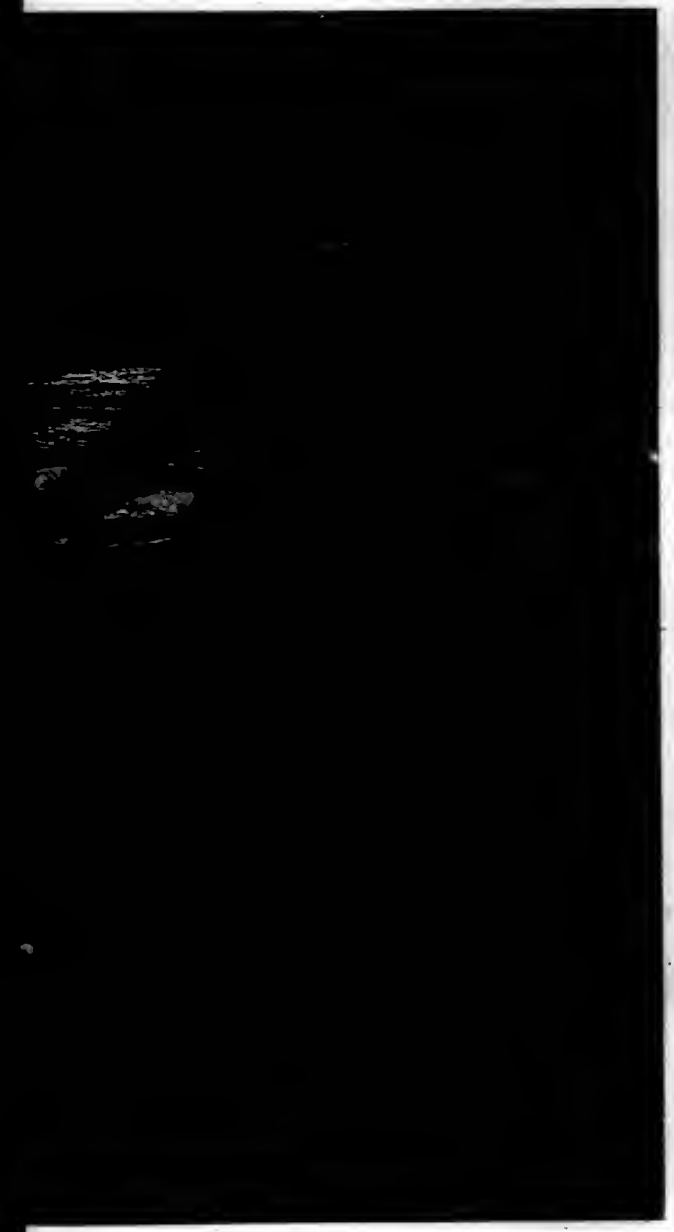
The manager has had his share of problems caused by computer viruses, he says, and he has had to be more stringent about what software students can run on PCs set up for their use. If students want to run programs at the library computing center, their software gets a close look-see on a stand-alone machine before they even enter the computer facility. It's not a foolproof practice, but it seems to have helped, he says.

This same PC manager also says he makes sure to have back-up copies of all system software stored in a safe place and that he regularly checks the software in use for signs of infection.

Those are worthwhile procedures, but he could do more. The National LAN Lab, which has a list of user guidelines for combating viruses, adds that system software should be backed up once a month, with the backup stored for at least one year before it is used again.

Once purchased, the software should by reviewed carefully by the system manager before it is installed on a distributed system.

Alexander is a *Computerworld* senior editor, PCs and workstations.



Not that Alan Tompkins expected it to work. After all, his HP graphics plotter had spent three months at the bottom of the Alsea River in Oregon. Ever since it was stolen from his office.

"I washed it out with a garden hose, dried it in the oven and plugged it in," Tompkins said. "Much to my surprise, it sprang to life and started spitting out graphs and charts."

Even at HP, our products don't go through humidity tests quite this severe. But almost. Because we know that a dud printer or plotter can sink your operation in a hurry. So, in 1980, we set up a Total Quality Control program to reduce failure rates tenfold by 1990. And we're right on schedule.*

The result: a 20,000-hour MTBF rating on our DeskJet, PaintJet and RuggedWriter printers; the Number One ranking for the HP LaserJet Series II in PC Week's Poll of Corporate Satisfaction;** and a warranty on our small and large pen plotters four times longer than the competition.

So call **1-800-752-0900, Ext. 275X** for your nearest authorized HP dealer. You'll get a better product. And that's no fish story.

There is a better way.

HEWLETT PACKARD

*Based on an average of all HP products at end of 1988 fiscal year. **February, 1989

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Now access JES2 queues, ICF Catalogs and MVS DASD datasets, *directly from CMS.*

(312) 525-6400

ChicagoSoft

730 N. LaSalle St., Chicago, IL 60610

NEW! NEW! NEW!

NEW PRODUCTS

Software applications packages

Specifications of material properties commonly used for structural design are now available on a database from Engineering Software Co.

The Properties Module is a personal computer-based package that provides technical information on most commonly used steel or wood structural properties, the company said. The software was designed to eliminate manual researching and is priced at $595.

Engineering Software
10670 N. Central Expwy.
Dallas, Texas 75231
214-361-2431

BBN Software Products Corp. has updated its data analysis and graphics software package for IBM Personal Computers and compatibles.

Release 4.0 of RS/1 was designed specifically for research and development, engineering and manufacturing quality-control applications, the company said. Enhancements reportedly include additional statistical methods and graphics capabilities as well as revised documentation containing statistical algorithm references. The software costs $2,000 per single copy, and quantity discounts are available. Current customers can upgrade for $95.

BBN Software Products
10 Fawcett St.
Cambridge, Mass. 02238
617-873-5000

Digital Vision, Inc. has upgraded its video digitizer system software, the company said.

Computereyes Version 3.1 operates with an IBM Personal Computer, and captured images are displayed with Hercules Computer Technology Co.'s Hercules, IBM's Video Graphics Array or other standard graphics capabilities. No additional hardware is required, according to the vendor. Features reportedly include a device driver package for developers and support for high-resolution 640- by 480-pixel image capture. The product is priced at $249.95; current customers may upgrade to the new release for $15.

Digital Vision
66 Eastern Ave.
Dedham, Mass. 02026
617-329-5400

Software utilities

A diagostic software tool for IBM Personal Computers, Personal System/2s and compatibles has been introduced by Jensen Tools, Inc.

Called Helpme, the program reportedly reports on processor type, clock speed and drive size and was designed to assist technicians in repairing or maintaining unfamiliar PC systems. The product locates hidden files, system files, drivers, applications and libraries and requires 256K bytes of random-access memory. Helpme costs $99.

Jensen Tools
7815 S. 46th St.
Phoenix, Ariz. 85044
602-968-6241

A hard-disk locking utility designed to offer protection against unauthorized access to stored data has been introduced by Rupp Corp.

Fastlock allows computer users to lock up their hard disks in less than 15 seconds, the vendor said. The product encrypts the access table to the system files, and authorized users must submit the proper predetermined password to access the system. It is priced at $69.95.

Rupp
835 Madison Ave.
New York, N.Y. 10021
212-517-7775

OS/2 software

Underware, Inc. has announced that its program editor package, Brief, is now available to run in the IBM OS/2 operating environment.

The software reportedly includes a special-purpose compiled language to customize the editor to suit the user's needs. Tutorial aids, language-sensitive indenting, a LISP-like syntax and a C-like alternative macro language syntax are also provided. The package costs $195, and toll-free technical support is available, the vendor said.

Underware
321 Columbus Ave.
Boston, Mass. 02116
617-267-9743

Macintosh products

Jasmine Technologies, Inc. has introduced a digital audio tape drive for Apple Computer, Inc. Macintosh computers.

According to the vendor, the Jasmine Directdigital Tape has a 1.2G-byte capacity and is capable of locating data anywhere on the tape within 40 seconds. The mass storage system reportedly transfers 1M byte of data in an average of 25 seconds and utilizes a 4mm tape-cassette format.

It is priced at $6,995.

Jasmine Technologies
1740 Army St.
San Francisco, Calif. 94124
415-282-1111

A price/performance breakthrough for 386-based systems, the new Tandy 4000 SX combines more integrated features than ever before in a machine at this price.

The Intel 80386SX microprocessor combines the ability to operate high-performance 80386 based software, as well as current 80286 and 8088 based software. You get the combination of 32-bit performance with 16-bit hardware compatibility.

This means the Tandy 4000 SX insures your computer investment for the future. As a low-cost alternative to an expensive 386 system, you won't be left behind when you want to move on to more advanced 386 based applications, like MS® OS/2.

Built-in VGA graphics give you beautifully detailed, high-resolution displays. Add a color analog monitor and create astonishing graphics using a palette of 256,000 colors for near-photographic clarity.

The 4000 SX's SmartDrive™ Integrated Drive Electronics (IDE) technology allows you to add high-performance hard disk drives without the need or expense of installing a separate disk controller.

The new Tandy 4000 SX. From the best-selling family of PC Compatibles in America.

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Company _____
Address _____
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A DIVISION OF TANDY CORPORATION

SmartDrive/TM Tandy Corp. Intel and 386/TM licensed from Intel Corp. MS/licensed from Microsoft Corp.

It shouldn't
matter how
a computer gets
information.

Information.

It comes in all shapes and sizes. And it can be found nearly everywhere you look.

Yet invariably, the information that's most needed is that which is least accessible.

Typically, it's distributed throughout the maze of mainframes, minicomputers, and file servers that your organization has acquired—systems in which it has a sizeable investment.

People are expected to navigate this labyrinth of systems in order to find the information they need to make timely, accurate decisions.

A daunting challenge, to say the least.

So how do people go about getting whatever information they need, wherever it is—and whenever they want it?

More important, how can they view the information in a way that makes sense to them? In a way that can help accelerate the decision-making processes they face every day?

As it turns out, the answer to those questions can be a remarkably simple one: Start with Macintosh®.

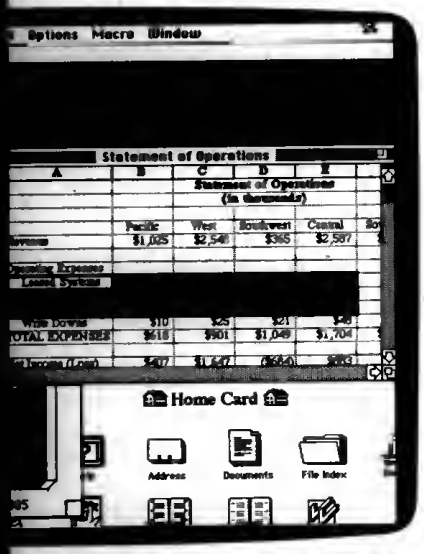
Because an Apple® Macintosh computer makes its power accessible to anyone who's willing to give it a try. And, when used in conjunction with the wide range of advanced applications available, it gives people the ability to do things they've never done before.

With Macintosh, people can concentrate on the task that needs to be done—whether it's drafting a memo, creating a presentation, or exchanging files over a network—instead of concentrating on the tool they're using to perform it.

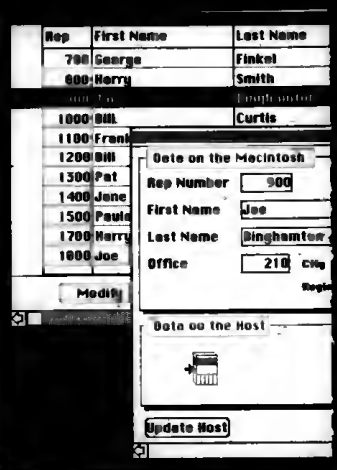
Because Macintosh works the way people work.

It takes familiar, everyday items and applies them—in the form of on-screen icons—to personal computing. And it makes the computer's functions available through easy-to-use menus with terms that people can readily comprehend: open, copy, paste, print, save, quit, and so on.

As a result, many people have overwhelmingly accepted the way Macintosh enhances the experience of using a personal computer. Now they're extending their reach, looking to new sources for the information they need, and to existing sources for information in new forms.



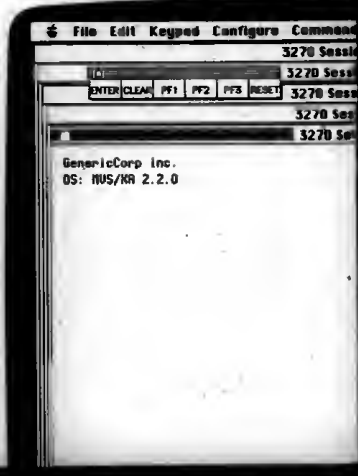
With a Macintosh, you can have multiple applications and documents open at the same time. To work with the one you need, simply click on its window and the application becomes active. In addition, much of the information you work with can be copied and pasted between applications



Using programs available today, it's possible to create Information from the host can be displayed on the screen applications, including such features

What m what people it when th

The networking and communications hardware and variety of ways. For example, a combination of products in a window on



custom applications that can access a host system in a format that is consistent with traditional Macintosh as icons, scroll bars, and windows

atters is can do with ey get it.

software described in this brochure can be used in a can emulate a terminal—running multiple host sessions—the Macintosh screen.

And they're looking to Macintosh for help. Because it enables them to view all of those sources of information in a familiar, consistent way.

One of Apple's original objectives for the Macintosh was to make the technical complexities of computing completely transparent. We believed that most people didn't want (or need) to know how information got from one place to another, or how a document was printed—just as long as it did.

As Macintosh extends its reach beyond the desktop into other computing environments—Digital, IBM, OSI, and TCP/IP—our commitment to insulating people from technical complexities is also being extended.

Which leads us to ask an intriguing question: What if the information you need—no matter where it is—could easily be reached from your Macintosh and integrated with the applications you use, in a manner that is consistent with the way Macintosh works?

Those are the goals of Apple's networking strategy:

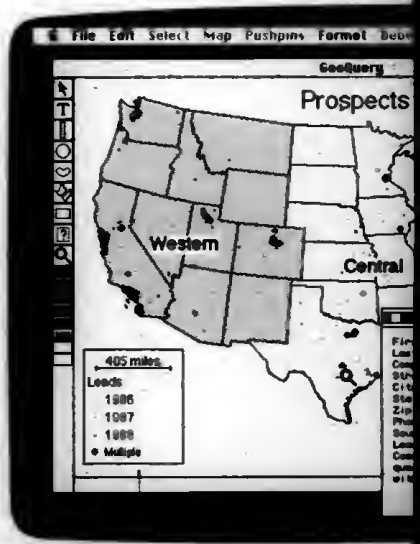
To make networking both simple and powerful, so people can access and use information more easily than ever before. And to make networking transparent to everyone on the network—whether they're down the hall, up the street, across the country, or on the other side of the world.

The networking and communications hardware and software products we describe in this brochure extend Macintosh computers into new areas, as well as allowing Macintosh to work in industry-standard and multivendor environments. This makes it possible to get information in ways you may already be familiar with—and in ways you never expected.

As these products become integrated into the environments for which they were designed, they will enhance the way people work—individually and collectively. Because information that is available to them will appear when they need it, in the form that best suits their purpose.

And all they'll have to do, in classic Macintosh style, is point and click.

Because, when you get right down to it, getting the information you want—in a way you can use and understand—is all that really matters.



Today it's possible to develop applications that can take the data you work with every day and turn it into meaningful information that you can use in a variety of ways. Information can be integrated from a range of sources and displayed on any Macintosh computer

What you ne

Every Apple Macintosh computer has the "plug and play" capabilities provided by the AppleTalk® network system. This allows Macintosh computers to be used in any environment, from a small departmental workgroup to a high-performance, facilitywide internet.

Today there are more than 2 million AppleTalk nodes in use, making it one of the most widely installed network systems. And because the AppleTalk network system was designed in accordance with the same principles that Macintosh is based on, it's easy for organizations to install and support.

Apple TokenTalk NB Card
The Apple TokenTalk NB Card works with any of the computers in the Macintosh II family of systems, it allows

Apple Coax/Twinax Card
The Apple Coax/Twinax Card allows computers in the Macintosh II family of systems to be connected to an IBM

Apple EtherTalk NB Card
The Apple EtherTalk NB Card provides computers in the Macintosh II family of systems with direct connectivity to

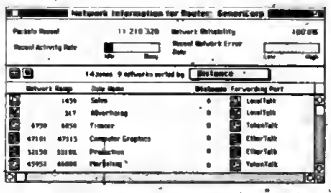
Apple Serial NB Card
For computers in the Macintosh II family of systems, the Apple Serial NB Card provides flexible communications

One of the innovative features shared by the Apple Coax/T which combines an on-board 68000 microprocessor, m of communications protocols, freeing the main Macintosh

eed to get the information you need.

AppleTalk offers two advantages that make it unique among network systems: It's easy to use, and you can easily build a flexible, powerful networking environment with it.

Because AppleTalk is a complete network system that offers the flexibility to choose the type of network that best suits your application. In fact, our latest version of AppleTalk, AppleTalk Phase 2, can run over LocalTalk™ cabling, as well as Token-Ring and Ethernet networks. And it will deliver the highest level of performance that the selected network can support.



The AppleTalk Internet Router allows you to improve the performance and manageability of an AppleTalk network system. It can be used to interconnect LocalTalk, TokenTalk™ and EtherTalk™ networks to form an internet. Which means that users can share files and printers, and send and receive mail, across the internet in the same way that they access those resources on a single network.

In addition to Macintosh systems, AppleTalk supports a variety of other environments, including Digital VMS,™ UNIX, MS-DOS, and Novell NetWare.

But what hasn't gotten lost, in the flurry of acronyms that characterize the world of communications, is the underlying idea that networking doesn't have to be a lot of work.

In fact, when it comes to getting your network to work the way you expect it to, AppleTalk may be all your computers need to know.

them to connect to IBM and other IEEE 802.5–compatible Token-Ring networks. And because the card supports a variety of network protocols (including AppleTalk, 3270, LU 6.2, and SMB), it can be used to access local area network services and mainframe-based services. The TokenTalk NB Card includes TokenTalk software, which implements AppleTalk support for AppleTalk Phase 2 networks and brings AppleTalk services (such as access to LaserWriter® printers and AppleShare® file servers) to Macintosh computers connected in a Token-Ring network. The card can also be used with MacDFT software to access mainframe-based applications and data, as well as with the Macintosh SMB File Transfer Utility to transfer files to and from an IBM PC LAN server on the network.

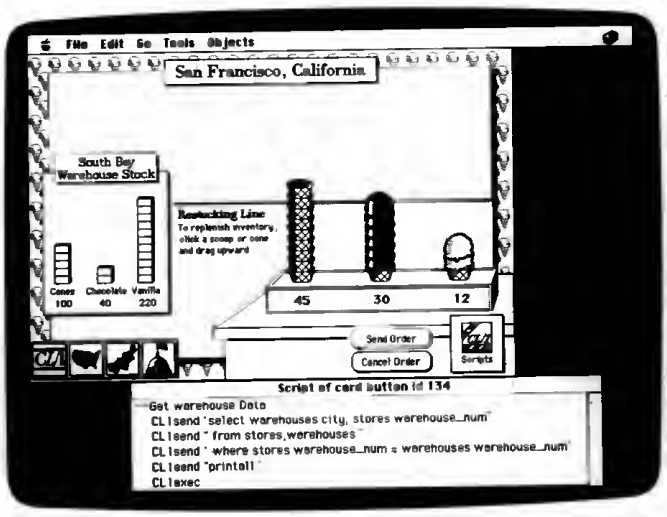
SNA network as 3270 Information Display Systems using industry-standard coax cabling. This capability allows users to access mainframe-based applications and data from a window on the Macintosh screen just as they would from a standard terminal. When used with MacDFT™ software, the Apple Coax/Twinax Card can support single-session Control Unit Terminal (CUT) emulation or up to five-session Distributed Function Terminal (DFT) 3270 emulation. Data can be transferred to and from mainframes (running VM/CMS or MVS/TSO) using the IBM IND$FILE package, as well as through the Macintosh Clipboard via standard "copy" and "paste" operations. And MacDFT can be used to assign function keys on the Macintosh keyboard to functions in 3270 applications.

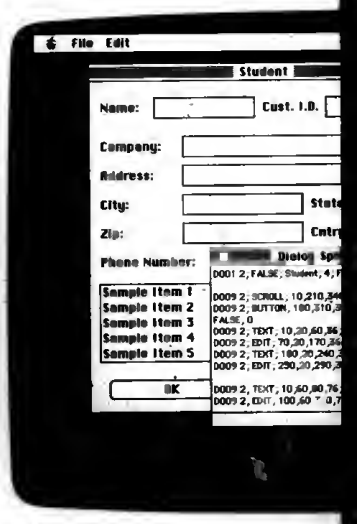
802.3 Ethernet networks (it can be used either with thin coaxial cable, or with thick coaxial or twisted-pair cable using external transceivers). And it allows connected Macintosh systems to be used with a variety of networking protocols, including AppleTalk and TCP/IP. Included with the Apple EtherTalk NB Card is EtherTalk software, which implements AppleTalk support for AppleTalk Phase 2 networks and allows Macintosh users on the network to access network services (printers, file servers, and other resources). The card also works with MacX™ software, a display server that supports the X Window protocol and runs in a window on the Macintosh desktop.

options. It comes with four serial ports that can be configured for use as RS-232, RS-422, X.21, or V.35 communications ports. And when it is used with MacAPPC™ software, the Apple Serial NB Card provides SDLC connectivity to SNA environments. MacAPPC gives programmers the necessary software tools to write applications that support distributed communications services between Macintosh and LU 6.2–based systems connected to an SNA network. But more important, it provides them with the tools they need to give people access to mainframes via the Chooser, the standard Macintosh interface for selecting file servers, printers, and other resources. The Apple Serial NB Card is also the platform for the MacX25™ server, which gives users on an AppleTalk network transparent access to host services over X.25 packet-switched data networks.

Card, the Apple TokenTalk NB Card, and the Apple Serial NB Card is the Macintosh Coprocessor Platform,™ and an operating system. For these NuBus™ cards, this "intelligent" design supports the independent execution of processor from those tasks and allowing it to concentrate on other applications.

Why you sh
on our latest d





CL/1 *MacW*

In any networking environment, the most important connection that must be made is the connection between the individual and his or her computer.

And in keeping with the tradition of Macintosh, we're offering tools that developers can use to customize their applications, giving them the look and feel that has come to characterize Macintosh applications.

For example, there's CL/1,™ a complete connectivity language based on the client/server model. CL/1 gives developers the ability to build applications that provide transparent access to multivendor SQL database management systems in the IBM and Digital environments.

We also offer MacWorkStation™ software, a development tool that allows programmers to modify host applications so that when they are run from a Macintosh, the applications present a graphical interface to the user. MacWorkStation gives developers access to menus, dialog boxes, and other features that are characteristic of the Macintosh interface.

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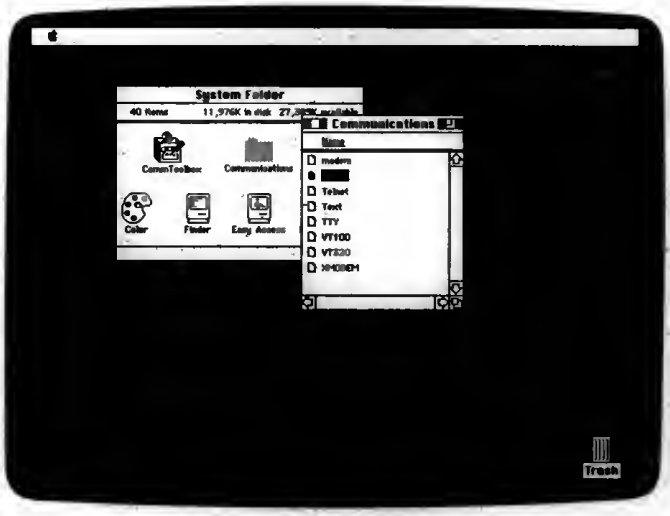
evelopments.

rkStation



Communications Toolbox

For developers who need to use lower-level communications functions, we offer application and system programming interfaces for AppleTalk, 3270, APPC, X.25, and TCP/IP. These interfaces allow developers to write special-purpose programs that take advantage of the strengths of the underlying network connections.

Finally, to facilitate the development of consistent Macintosh communications applications, we offer the Macintosh Communications Toolbox, an extension of the system software that provides standard access to data connections, terminal emulators, and file transfer protocols.

These products are just a sample of the kind of tools we're offering to developers—tools that enable them to help Macintosh users better understand and make use of the increasing volume of information that's available today.

And that just might be the most significant development of all.

How to get what's coming to you.

When evaluating Macintosh, there are two subjects you should consider.

Just a few short years ago, AppleTalk made networking Macintosh computers a snap. Literally.

Today, not much has changed—except for the number of ways in which Macintosh and AppleTalk can help you when it comes to making the right connection.

To find out how well connected Macintosh can be, contact an authorized Apple reseller or representative to arrange for a presentation.

You may also be interested in learning how these products integrate with our family of systems via Apple's Open Architecture System Integration Strategy. Call 1-800-446-3000, ext. 600, to receive a brochure that outlines the design features that make Macintosh unique.

Once you've made those connections, you'll understand precisely what Macintosh is coming to.

And why so many people are coming to Macintosh.

Apple Computer, Inc. 20525 Mariani Avenue Cupertino, California 95014

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(508) 935-4565 or (508) 875-5000, Ext. 4565

Conference attendees are also invited to the
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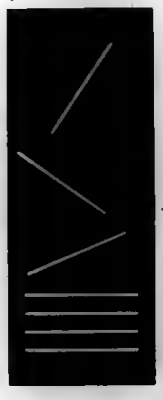

COMPUTERWORLD
PERSPECTIVES 1989

We're standard, but

	Intergraph	Sun
UNIX-based os	X	X
C, Fortran	X	X
X-Windows	X	X
PHIGS	X	X
GKS	X	X
Ethernet	X	X
TCP/IP	X	
DECnet		
NFS		
RS232		
SCSI		

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Intergraph's RISC-based CLIPPER® platform allows us to offer hundreds of third-party software products. Additionally, a full suite of development tools provides an ideal platform for third-party vendors.

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Intergraph goes beyond the source compatibility of other vendors. We offer binary compatibility. So software running on any CLIPPER system will run on all future CLIPPER systems without modification. This protects your investments in software, training, and databases.

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INTERGRAPH

Intergraph and CLIPPER are registered trademarks of Intergraph Corporation.

Integraph Corp. has announced a version of its Microstation Cadd software developed specifically for Apple Computer, Inc.'s Macintosh environment.

Dubbed Microstation Mac, the package reportedly offers graphics database compatibility with other Microstation versions and an interface to Oracle Corp.'s Oracle relational database manager for nongraphic data. Other features include reference files, three-dimensional capabilities and on-screen menus. A Mac II, Mac IIX, Mac IICX or Mac SE/30 is required. Scheduled for availability in July, the software will carry a price tag of $3,300.

Integraph
One Madison Industrial Park
Huntsville, Ala. 35807
205-772-2000

Dayna Communications, Inc. has announced DOS Mounter, a utility that reportedly provides desktop support for 3½-in. MS-DOS disks used in Apple Computer, Inc. Macintosh Floppy Drive High-Density (FDHD) disk drives.

The system utility lets the FDHD drive access MS-DOS disks from the desktop instead of through Apple's File Exchange and includes a function that allows the user to open an MS-DOS file into a Macintosh application by double-clicking on the file's document icon, the company said.

DOS Mounter costs $89.95.

Dayna Communications
50 S. Main St.
Salt Lake City, Utah 84144
801-531-0600

Development tools

Computer Systems Advisers, Inc. has announced the ninth module in a series of computer-aided software engineering tools.

Called Pose-SRP (Screen Report Prototyper), the latest module reportedly enables system designers to develop prototype screen displays, reports and system simulations. The product is priced at $495 and runs on IBM Personal Computers, Personal System/2s and compatibles. The entire nine-module Pose software system is available for $2,265, according to the vendor.

Computer Systems Advisers
50 Tice Blvd.
Woodcliff Lake, N.J. 07675
201-391-6500

A C Cross Development System for the Tandy Corp. Model 100/102 portable computer has been announced by King Computer Services, Inc.

According to the company, the product offers a C support library that includes functions for accessing the dialer, modem, RS-232 port, sound and graphics. The program is priced at $695.

King Computer Services
1016 N. New Hampshire
Los Angeles, Calif. 90029
213-661-2063

A software tool designed to combine hypertext text retrieval with expert systems development capabilities is available from 1st Class Expert Systems, Inc.

1st-Class HT-Hypertext allows applications developers to build systems for users who need to access text or require extensive Help facilities to navigate a tree-structured expert system. The product runs on IBM Personal Computers, XTs, ATs and compatible systems and is priced at $2,495.

1st Class Expert Systems
526 Boston Post Road - 150 East
Wayland, Mass. 01778
508-358-7722

Microsoft Corp. has released Version 1.1 of Programmer's Library, a compact disk/read-only memory productivity tool designed to give programmers access to a large collection of books, technical manuals and sample programs.

The latest release reportedly includes 72 books and manuals grouped into 11 reference catagories and offers more than 26M bytes of sample code. As many as three users can access a single disk. The product is priced at $395, and an update is available free of charge to all registered users of Version 1.0, the vendor said.

Microsoft
16011 N.E. 36th Way
Redmond, Wash. 98073
206-882-8080

Training

Scandinavian PC Systems, Inc. has announced the PC Crash Course and Survival Guide, designed specifically for first-time users of IBM Personal Computers and compatible systems.

The product consists of a paperback book and a full set of disk tutorials that guide the user through the start-up process, disk formatting, directory display and copy- and delete-file functions, according to the vendor. The guide will cost $29.95, the company said.

Scandinavian PC Systems
51 Monroe St.
Rockville, Md. 20850
301-294-7450

Tap Development Corp. is offering an enhanced version of its Teaching Assistance Package for MS-DOS.

According to the company, the latest release is a one-day course that covers both basic and advanced features of the MS-DOS operating system. The package is also said to provide instruction for the latest MS-DOS 4.01 software. The package reportedly contains 160 color slides with narratives, student diskettes, workbooks and test materials for examinations

24 Hours of Torment Yield a Lifetime of Reliability

Created by Dayner/Hall Inc., Winter Park, Florida

or homework assignments.

The Teaching Assistance Package for MS-DOS is priced at $990.

Tap Development
Suite 200
1820 E. Sahara Ave.
Las Vegas, Nev. 89104
800-231-5455

Bernstein & Associates, Inc., a training and consulting firm specializing in Digital Equipment Corp. VAX/VMS technology, has announced the Personal Trainer-Series II.

The computer-based training package runs on IBM Personal Computers and compatible systems and provides instruction for logical names, symbols and batch-processing functions in the VAX/VMS environment, the company said. The product is priced at $300 and includes a reference manual.

Bernstein & Associates
Suite 103
3 Dunwoody Park
Atlanta, Ga. 30338
404-392-1488

Data storage

Consolink Corp. has enhanced its family of Instant Image tape products with the announcement of a 150M-byte storage capacity and an interface for IBM's Micro Channel Architecture, the company said.

The Instant Image Tape Backup System 150M-byte units are available in both internal and external configurations and are priced at $1,799 and $2,199, respectively. The devices operate with IBM Personal Computers, Personal System/2s and compatible systems.

Consolink
1275 S. Sherman Drive
Longmont, Colo. 80501
303-651-2014

Priam Corp. has introduced a series of 3½-in. internal disk storage systems that are reportedly targeted for desktop applications in the Intel Corp. 80286- and 80386-based computer marketplace.

The 43M- and 45M-byte storage systems feature a 28-msec access time, shock isolators and automatic head park and lock capabilities, the company said. Each unit reportedly includes a tested and formatted Winchester 3½-in. drive, mounting hardware, cables, partitioning software and an instruction manual.

The ID45T-AF 43M-byte device features an IBM Personal Computer AT interface and is priced at $720. The 45M-byte ID45T-SC is said to include a small computer systems interface and is priced at $1,070. Several other drive configurations are also available in the series.

Priam
20 W. Montague Expwy.
San Jose, Calif. 95134
408-434-9300

A desktop-configured mass storage device has been announced by MDB Systems, Inc.

The Data Shuttle 1000 shock-protected removable canister reportedly contains switch-activated wire protection and was designed for the personal computer and workstation environment. The unit contains any 5¼-in. form factor device with capacities from 86M to 760M bytes unformatted with a small computer systems interface. The Data Shuttle 1000 chassis costs $1,195, empty disk canisters $485 and removable canisters $600, the company said.

MDB Systems
1110 W. Taft Ave.
Orange, Calif. 92613
714-998-6900

Board-level devices

Hauppauge Computer Works, Inc. has announced a 25-MHz Intel Corp. 80386 motherboard upgrade for IBM Personal Computer ATs and compatibles. The replacement board reportedly features 64K bytes of zero-wait state cache and 4M bytes of 32-bit main memory. The board is priced at $4,495.

The company also announced price reductions on three of its major products. The 386 PC/Motherboard and XT/Motherboard units have each been reduced from $1,695 to $1,595, and the 386 AT/Motherboard has been cut from $1,795 to $1,595.

Hauppauge Computer Works
175 Commerce Drive
Hauppauge, N.Y. 11788
516-434-1600

Connect Computer Co. has announced a dual-slot expansion unit for Toshiba America, Inc. T1200, T1600, T3100 and T5100 portable computers.

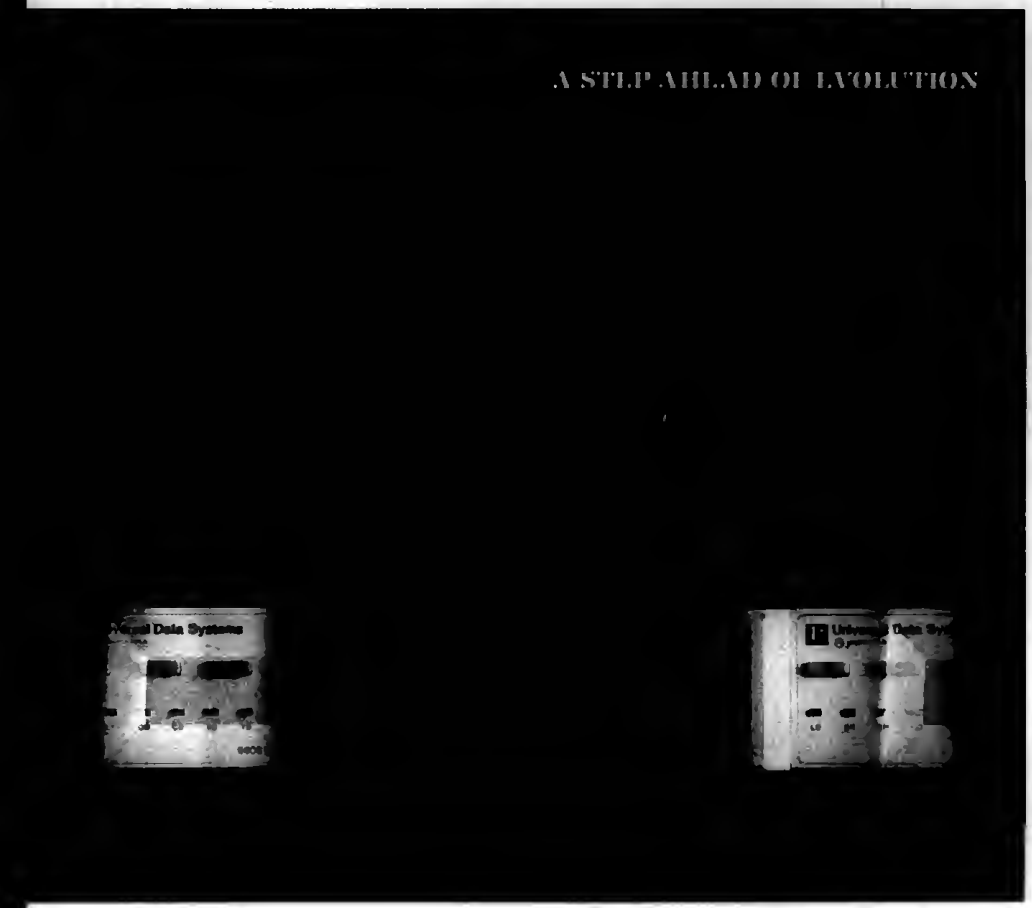
The Wonunder II extends the capabilities of the laptops by letting users add two standard full-size personal computer expansion cards. The product supports Ethernet, Token-Ring and other networking environments and costs $479.

Connect Computer
9855 W. 78th St.
Eden Prairie, Minn. 55344
612-944-0181

A 16-MHz Intel Corp. 80286-based motherboard with built-in monochrome graphics has been introduced by DTK Computer, Inc.

The PTM-1660C provides a floppy disk controller, a 16-bit AT bus header and an IBM Personal System/2-like keyboard mouse port. Two serial ports and one parallel port are included, the vendor said. The unit is priced at $725.

DTK Computer
15711 E. Valley Blvd.
City of Industry, Calif. 91744
818-333-7533



5urvival of the fittest — that's what evolution is all about. To make sure that UD5 modems are fit to survive, we submit *every one* to a hellish 24-hour test regime. That's how we weed out the weaklings.

During the testing, each modem is cycled between 0°C and 50°C. There's a one-hour "soak" at the first temperature extreme, followed by a 30-minute transition to the other. After a one-hour pause, the cycle is reversed — and repeated — for 24 gruelling hours.

Only the survivors get shipped. That's why UDS boasts a DOA rate of only 0.5%, compared with an industry average in the 2–5% range.

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Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/721-8000; FAX 205/721-8926.

Universal Data Systems
MOTOROLA INC.

WE CAN TAKE SOMETHING THIS COMPLICATED,

O'Hare Industries — Memorandum

From: Dave O'Hare
To: Alfred
Re: Tucson Office

Alfred:

Need to put Tucson on the network.

At 3Com, we make it possible to network more types of systems than anyone else. Even systems you never planned on networking.

Like the two dozen UNIX® workstations that suddenly appeared after the last reorganization.

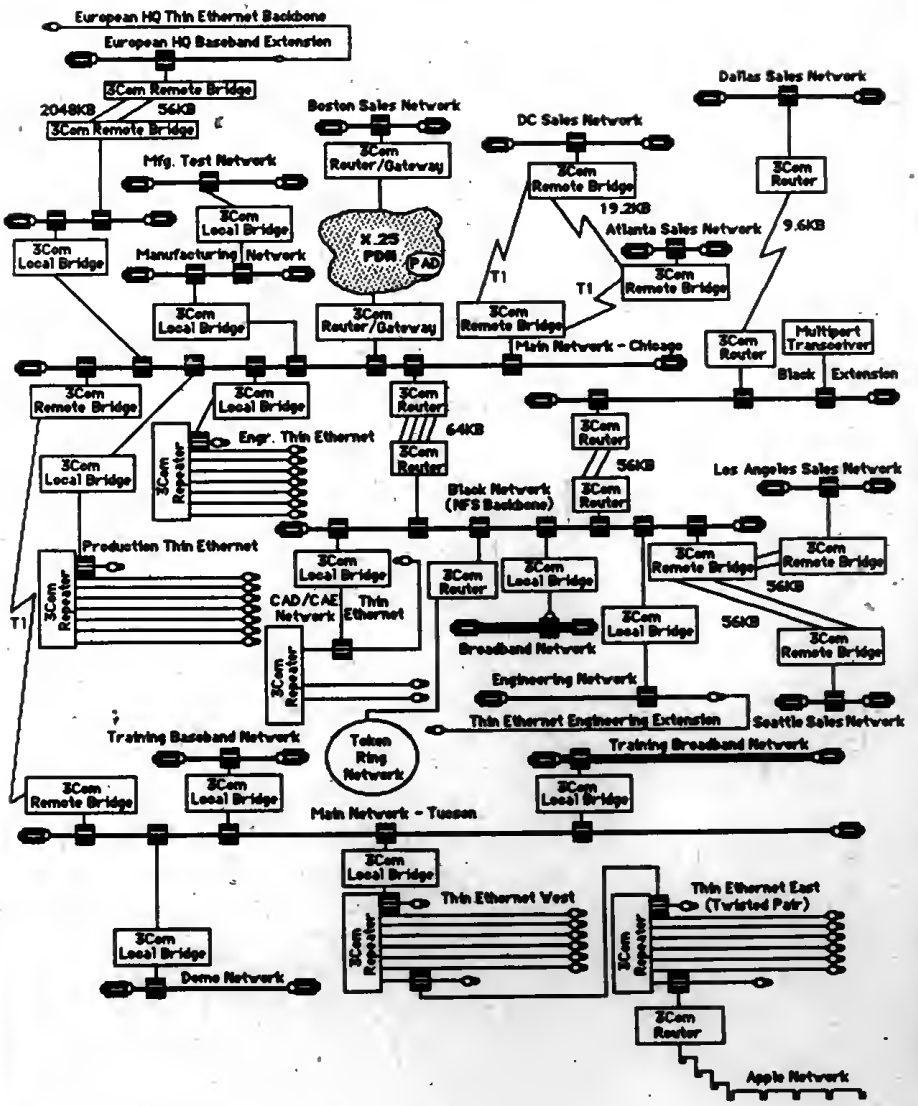
Or the [illegible] by the company's latest merger.

How does 3Com do it?

Well, for one thing, we make more modular networking products than anyone else.

[illegible] operating [illegible] to servers, bridges, and [illegible] you comfortably adapt to a [illegible] upon a platform

AND SIMPLIFY IT



A Comparison Chart of the Major Cooperative Processing Software Products:

Functions:	SUPER-LINK® Family	Enter/3270®	IBM's HLAPI™	IBM's APPC™ or CPI-C™	SQL*Star®	Arbiter®	Automator™
Cooperative Processing Topologies Supported							
Server/Requester	YES	NO	NO	NO	NO	NO	NO
PC-based Front-end To Existing Programs	YES	YES	YES	NO	NO	NO	YES
SAA/CUA Front-end Created Without Host Code Changes	YES	NO	YES	NO	NO	NO	NO
Peer-To-Peer Communications	YES	NO	NO	YES	NO	YES	NO
Distributed Database	NO	NO	NO	NO	YES	NO	NO
PC Developer's Toolkit							
4GL Language	YES	YES	NO	NO	YES	NO	NO
DBMS	YES	NO	NO	NO	YES	NO	NO
Screen Capture Facility	YES	YES	NO	NO	NO	NO	NO
Forms Generator / Screen Painter	YES	NO	NO	NO	YES	NO	NO
Can Call 3GL Subroutines	YES	YES	NO	NO	YES	NO	NO
Scripting Facility	YES	Partial	NO	NO	NO	NO	YES
Virtual Operator Mode	YES	YES	NO	NO	NO	NO	NO
Local Mainframe Communications Simulator	YES	NO	NO	NO	NO	NO	NO
Debugger	YES	NO	NO	NO	YES	NO	NO
Form Testing & Debugging System	YES	YES	NO	NO	YES	NO	NO
Host-based Transaction Simulator	YES	NO	NO	NO	NO	NO	NO
Automatic COPY LIB Generation	YES	NO	NO	NO	NO	NO	NO
Micro-based Table Generation Utility	YES	NO	NO	NO	YES	NO	NO
Automatic Generation of PC-level Documentation	YES	NO	NO	NO	NO	NO	NO
File Transfer Support							
ASCII/EBCDIC Conversion Of Data	YES	NO	NO	YES	NO	YES	NO
Transfer Of Binary Files & Text Files	YES	NO	NO	NO	NO	YES	NO
Transfer Under Host Or PC Program Control	YES	NO	NO	YES	NO	YES	NO
Full SDLC Error Detection/Correction For Asynch Links	YES	NO	NO	NO	NO	YES	NO
Front-End Processing Support							
SAA / CUA Fully Supported	YES	NO	NO	NO	NO	NO	NO
Optional Host Screen Pass Through	YES	YES	NO	NO	NO	NO	YES
Dynamic Control of Field Attributes	YES	YES	NO	NO	NO	NO	YES
PC FORMS of Up To Four Pages	YES	NO	NO	NO	NO	NO	NO
Field-level, Context-sensitive Help Facilities	YES	NO	NO	NO	NO	NO	NO
Automatically Non-Intrusive Help	YES	NO	NO	NO	NO	NO	NO
Optional Learning Mode Automatically Displays Help	YES	NO	NO	NO	NO	NO	NO
Icon-based Menus	YES	NO	NO	NO	NO	NO	NO
Light-bar Menu Selection	YES	YES	NO	NO	NO	NO	NO
Dynamic & Programmatic Cursor Control	YES	YES	NO	NO	NO	NO	NO
Softkey Labels	YES	NO	NO	NO	NO	NO	NO
Text Windows	YES	NO	NO	NO	NO	NO	NO
Peer-to-Peer Processing Support							
Data Compression	YES	NO	NO	NO	NO	YES	NO
Call-level interface between host and PC programs	YES	NO	NO	NO	NO	NO	NO
All Host Databases Supported	YES	NO	NO	YES	NO	YES	NO
All Host Applications Supported	YES	NO	NO	NO	NO	NO	NO
PC Developer's Toolkit Included	YES	NO	NO	NO	YES	NO	NO
Software Distribution Support							
Programmatic Interface	YES	NO	NO	NO	NO	NO	NO
Time/Date or Checksum Host Query	YES	NO	NO	NO	NO	NO	NO
Background Communications Support							
Simultaneous Background/Foreground Processing	YES	NO	NO	NO	NO	NO	NO
Control of Communications From Foreground Program	YES	NO	NO	NO	NO	NO	NO
Communications Protocols Supported							
LU2 Support	YES	YES	YES	NO	YES	YES	NO
LU6.2 Support	Planned	Planned	NO	YES	Planned	YES	NO
Application Portability							
Front-End Processing to Peer-To-Peer	YES	NO	NO	NO	NO	NO	NO
DOS To OS/2	Planned	Planned	Planned	NO	YES	Planned	Planned
LU2 To LU6.2	Planned	Planned	NO	NO	Planned	YES	NO
Host Environments Supported							
IBM TP Monitors Supported							
CICS	YES	NO	NO	YES	YES	YES	NO
IDMS/DC	YES	NO	NO	NO	NO	NO	NO
IBM Interactive Systems Supported							
VM/CMS	YES	NO	NO	NO	YES	NO	NO
MVS/TSO	YES	NO	NO	NO	YES	NO	NO
DEC VAX Supported	YES	NO	NO	NO	YES	NO	NO
Minimum PC Hardware Requirements							
IBM XT or Equivalent With 640k	YES	YES	YES	YES	NO	YES	YES

Every effort to present an accurate chart has been made, however no guarantee can be made. Enter/3270® is a registered trademark of Aspen Research. Automator ™ is a trademark of Direct Technology. Arbiter® is a registered trademark of Tangram Systems. SQL*Star® is a registered trademark of Oracle Corporation.

MULTI SOFT'S SUPER-LINK®

Family gives you SAA/CUA now, without mainframe coding!

INFRONT/DS™ (Development System) is a complete, PC-resident developer's toolkit, including: an intelligent screen management subsystem; a 4GL, with a source code debugger; and a PC-resident data base, with a series of data base maintenance utilities. INFRONT/DS™ allows a developer to add new functions and a PC-resident SAA/CUA-compatible front-end to existing HOST applications without changing any mainframe code.

INFRONT/RT™ (Run-time) is the run-time software that allows INFRONT/DS™ applications to run 'in front' of standard, 3270-based mainframe applications. With INFRONT/RT™ data is exchanged between the PC and mainframe by using the 327X screen image as the communications medium. INFRONT/RT™ supports a wide variety of 327X emulation interfaces including the IBM API's (HLLAPI and low level API), IRMA cards, and LAN gateways which account for over 90% of the installed base of 327X emulation cards and software.

INFRONT/HPO™ (Host Processing Option) extends INFRONT/RT™ into the development of peer-to-peer cooperative processing applications. INFRONT/HPO™ provides the cooperative processing capabilities of IBM's APPC (Advanced Program-to-Program Communications) product for PC/host applications. However, instead of requiring the use of LU6.2 SNA sessions, INFRONT/HPO™ executes over the LU2-based networks that are already in place. INFRONT/HPO™ uses INFRONT/DS™ to create PC forms. This allows all INFRONT™ form to be completely portable between the screen-based communications of INFRONT/RT™ and the peer-to-peer protocols of INFRONT/HPO™.

SDF™ (Software Distribution Facility) is an INFRONT/HPO™ application that brings the distribution of PC software and files under the programmatic control of the host, and provides a mechanism for ensuring that all users of standalone and cooperative processing applications are using the correct versions of all programs, forms, files, and tables.

INFRONT/BCF™ (Background Communication Facility) provides an API (application program interface) for PC programs that allows them to communicate with an IBM host on a file-by-file or record-at-a-time basis. Communications between the host and PC can take place on a real-time basis, or in a background mode where the communications process can execute as a background task managed by INFRONT/BCF™. This background task is implemented in a standard MS/DOS environment and allows any DOS program to run in the foreground. The foreground and background tasks can be completely unrelated.

Call Now!
800-888-4973

Multi Soft, Inc.
123 Franklin Corner Rd.
Lawrenceville, NJ 08648
609-896-4100
Fax # 609-895-0072
Telex # 821073

DATA STREAM

Elisabeth Horwitt

But is it a front end?

Will someone please give me a working definition of "front-end processor?" How does it differ from or relate to that even more nebulous term, "communications processor?"

IBM-compatible host front-end processors used to be easy to nail down. You had a three-vendor market — IBM, NCR Comten and Amdahl. You had a fairly finite set of functions having to do with coordinating communications to the host from multiplexers, local-area networks, modems and the like.

Except that everyone, including IBM, is twisting the traditional front end's definition like taffy. IBM announced PU2.1 support for host/front-end Systems Network Architecture software NCP and VTAM. Then it announced better X.25 support. And then it boosted up its high-end front end, the 3745, to support multiple T1 lines. The result: a front-end processor that doesn't necessarily "front end" a host at all. Instead, it acts as a node in a peer-to-peer SNA backbone, passing on PU2.1 and X.25 communications to other nodes and other

Continued on page 52

Network on trial

Heinz lawyers test a link for company's offices

ON SITE

BY RICHARD PASTORE
CW STAFF

PITTSBURGH — Approximately 30 H. J. Heinz Co. corporate attorneys are cross-examining a pilot project combining local- and wide-area networks linking four of the company's law offices. The firm is banking on saving as much as $500,000 a year by using the system.

The network will link Heinz world headquarters here with Heinz U.S.A. on the other side of the Allegheny River, as well as with two subsidiaries: Star-Kist Foods, Inc. in Long Beach, Calif., and Weight Watchers International, Inc. in Jericho, N.Y. If all goes well, the system will be fully implemented in September, according to Larry McCabe, vice-president and associate general counsel.

The configuration includes 50 Data General Corp. Dasher/286 IBM-compatible workstations linked by DG's PC*I network, a Netbios and Microsoft Corp. MS-Net-compatible Ether-

Continued on page 52

BRUCE ZAKE

Heinz's McCabe *oversees implementation of DG-based network*

Fax boards copy stand-alone gains

BY ELISABETH HORWITT
CW STAFF

PARSIPPANY, N.J. — Facsimile systems will become just one more communications board on the IBM Personal Computer family of micros. This is one important factor behind a market explosion that will add another million units next year to the 1½ million fax systems installed today, according to a recent study by The Eastern Management Group.

Other major factors include an expected plunge in prices and improved technology, said the research firm, based here.

PC fax boards will increasingly supplement stand-alone fax machines currently installed in corporate communications centers and mail rooms, Eastern Management said.

Such boards will become integrated with other PC-based communications systems, which include modems, electronic mail and perhaps voice-messaging technology, according to the study.

Higher transmission speeds, better quality transmission and decreased costs — not only in fax machines and boards but also in long-distance lines — have helped boost fax machine sales in the past few years, the research firm said.

Future developments that will further help the market include the availability of Group 4 fax machines, which transmit a page in less than 10 seconds over 64K bit/sec. private digital telephone lines and Integrated Services Digital Network links.

In comparison, it takes the older Group 3 digital fax machines approximately one minute to transmit a page over public switched telephone networks.

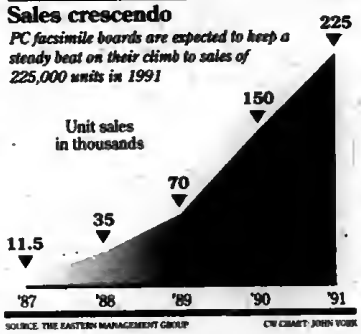
Priced at between $8,000 and $15,000, Group 4 faxes are also said to provide much clearer images than other types of faxes.

Another development that will drive the future market is

Continued on page 52

Sales crescendo

PC facsimile boards are expected to keep a steady beat on their climb to sales of 225,000 units in 1991



SOURCE: THE EASTERN MANAGEMENT GROUP — CW CHART: JOHN VOSS

Inside

- Communications vendors eagerly embrace AS/400. Page 50.
- Processor intros aid existing hosts, servers. Page 51.
- Motorola releases Unix-based net servers. Page 54.

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Net vendors roll out AS/400 red carpet

BY PATRICIA KEEFE
CW STAFF

Communications vendors are rushing to open up their product lines to embrace IBM's Application System/400.

Five recent product announcements cover the gamut of AS/400 connectivity options:

- Following an announcement by Joiner Associates last month, Forest Computer, Inc. in Okemos, Mich., has unwrapped plans to ship Connection System, an AS/400-to-Digital Equipment Corp. Decnet link, in July.
- Novell, Inc.'s Communications Products Division has introduced Netware support for the AS/400. The Netware 5250 Twinax Workstation provides personal computers with AS/400 and IBM System/34, 36 and 38 terminal emulation.
- Emerald Technologies, Inc. in Bothell, Wash., said its remote 5250 emulation products for PCs and Personal System/2s now provide access to IBM's AS/400 PC Support.
- Biscom, Inc. in Billerica, Mass., has unveiled Fax400, a multiuser automated facsimile delivery system for the AS/400. It includes a front-end processor — the Faxcom 1000 Plus — and AS/400-based host software developed by E.D.S. Computer Services in Marlboro, Mass.
- Gammalink has announced a combination of IBM software and Gammafax hardware to provide fax service for existing IBM VM, MVS and AS/400 environments and Officevision.

Forest said Connection System is a turnkey system that does not require third-party software on the DEC or IBM systems. The initial release will accommodate a bidirectional file transfer between the AS/400 and DEC VAX equipment. The product will be available in the fourth quarter; pricing starts at $24,000.

On the IBM side, Connection System uses an LU6.2 transport into the AS/400's Distributed Data Management file access facility. Connection's hardware interfaces to IBM via a Token-Ring link. Logically, it will appear as another AS/400.

On the DEC side, Connection will use a standard Ethernet interface into Decnet, emulating a Decnet end node. Connection also interfaces to Decnet's File Access Listener using the Data Access Protocol.

Forthcoming releases of the system will include virtual 5250 and VT2220 terminal sessions for release in the fourth quarter; an LU6.2 programmatic interface between IBM and DEC slated for release in the first quarter of 1989; and an IBM Systems Network Architecture Synchronous Data Link Control attachment to IBM, also scheduled to ship in the first quarter.

The Netware 5250 Twinax Workstation replaces Novell's PCOX/5250 Twinax software, which will be phased out. It provides device emulation and application support for IBM's midrange, excluding the 9370. The new software costs $250 and requires Novell's Twinax Adapter card, which costs $545.

This first piece of AS/400 connectivity will be bolstered by plans to provide a Token-Ring gateway to the AS/400 and a local, twin-axial gateway support for the AS/400 and System/34, 36 and 38, said Jerry Machi, Novell's director of product marketing for communications products.

The final step will be moving Netware onto the AS/400, a move Machi said is at least a year away. The lack of an AS/400 C compiler is all that stands in the way of moving Portable Netware to IBM's strategic midrange computer, he added.

Emerald couples its 3XMate or 3XPlus with its new AS/400 PC Support remote adapter handler software, which acts as a bridge to allow the use of all versions of PC Support, to eliminate the 5394 controller. Customers using Emerald products to connect to System/34, 36 and 38 hosts can migrate their investment to the AS/400, the vendor said.

The AS/400 PC Support software is now standard with all Emerald products. For a limited time, software upgrades are free for current users by calling Emerald.

Both Novell and Emerald are playing catch-up with Billerica-based Ideassociates, Inc., which has been shipping a 5250 gateway connecting to the AS/400 or the System/34, 36 and 38 for more than two years.

That product was upgraded in March. Gateway Plus provides users with three options, said Cathy Eftimiou, Ideassociates' product manager for midrange communications products. It connects PCs on a LAN to either host system, provides similar connectivity for non-networked PCs linked to a server or gateway via serial cable and connects remote PCs through asynchronous modems. The software costs $1,295, and the board is priced at $645, Eftimiou said.

Biscom's Fax400 reportedly allows any AS/400 user to transmit documents from the desktop direct to any Group III fax. Fax36 users can upgrade to Fax400. System pricing is approximately $6,800.

IBM has selected Gammalink to supply the fax boards needed for its Office Facsimile Application, announced at last month's Systems Application Architecture introduction.

Netlink, Jupiter orbit into networked processors arena

BY ELISABETH HORWITT
CW STAFF

Two recent product introductions in the communications processors arena are designed to increase the network flexibility, efficiency and effectiveness of existing hosts and servers.

Netlink, Inc. in Raleigh, N.C., announced Netlink Branch Information Gateways, based on its existing SNA Hub product. The Hub is typically used as a front-end processor for multiple IBM Systems Network Architecture (SNA)-compatible hubs, but unlike an IBM front-end processor, which can only provide direct access to a classic SNA mainframe, the SNA Hub also provides direct access to IBM Application System/400s, IBM System/88s, Tandem Computers, Inc. hosts and other systems "that don't exactly fit into the SNA structure," according to Rod Starrett, Netlink manager of OEM sales.

The Branch Information Gateways make use of another Hub feature: the ability to act as a concentrator for downstream devices such as local-area networks, multiplexers and application processors, allowing multiple applications and services to share the same line to the host, Starrett said.

Netlink will initially target the gateways at banks, which typically must keep adding application processors at various branches, to support a variety of new services, Starrett added. Without the gateways, banks must install a new line to the host at each branch for each new service, increasing communications costs and requiring that the SNA network topology be redesigned each time, according to Starrett. The gateways allow multiple applications, processors and even lines from different branches to address an IBM host as a single SNA Physical Unit, or PU, so that additional services require no network redesign or new host lines, he added.

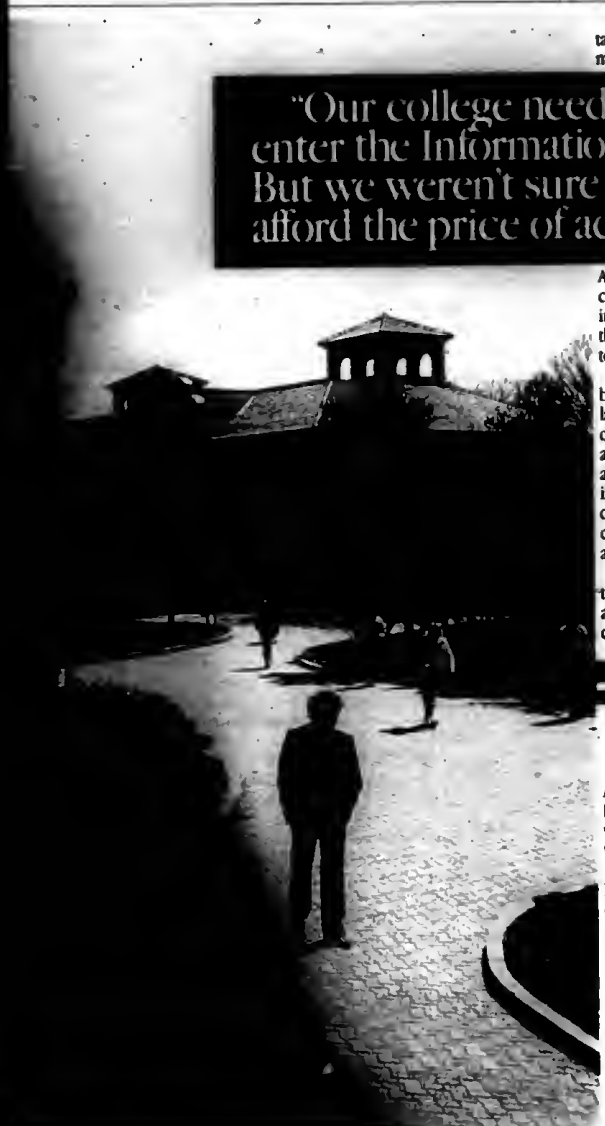
> NETLINK WILL initially target the gateways at banks to support a variety of new services.
>
> ROD STARRETT
> NETLINK

The new Branch Information Gateways provide support for point-of-sale terminals and are priced at $7,000, $3,000 less than the Hub, with volume discounts available, so that companies can justify installing them as concentrators at multiple remote sites, Starrett said.

Another host front-end vendor, Jupiter Technology, Inc. in Waltham, Mass., has introduced support of the Transmission Control Protocol/Internet Protocol (TCP/IP) networking standard for its System 1000 and System 100 data communications computer systems.

The multiprocessor systems are said to use a proprietary, modular communications software environment, Softlink, to provide connections among a variety of computer systems and over a range of networking environments, including asynchronous lines, X.25 packet-switched networks and SNA systems.

Jupiter's communications platforms can now connect TCP/IP to non-TCP/IP systems and include security features, the firm said. Available now, the TCP/IP software package is priced starting at $3,000.



For an educational institution, nothing is more important than the smooth exchange of information. That's why many colleges are making information networking a top priority.

The toughest challenge is connectivity. Colleges and universities, like most places, acquire computers and telecommunications hardware in patchwork fashion, ending up with little or no compatibility.

For one northeast college, AT&T Network Systems, working with the local telephone company, demonstrated that ISDN was the solution. Their information services manager explained: "ISDN gave us the best capabilities for the least cost. And we didn't have to trash our existing systems."

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As the college's IS manager puts it: "ISDN can revolutionize the education experience. It's going to make us a better college. And, bottom line, a more competitive college."

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AT&T links gather support from a variety of vendors

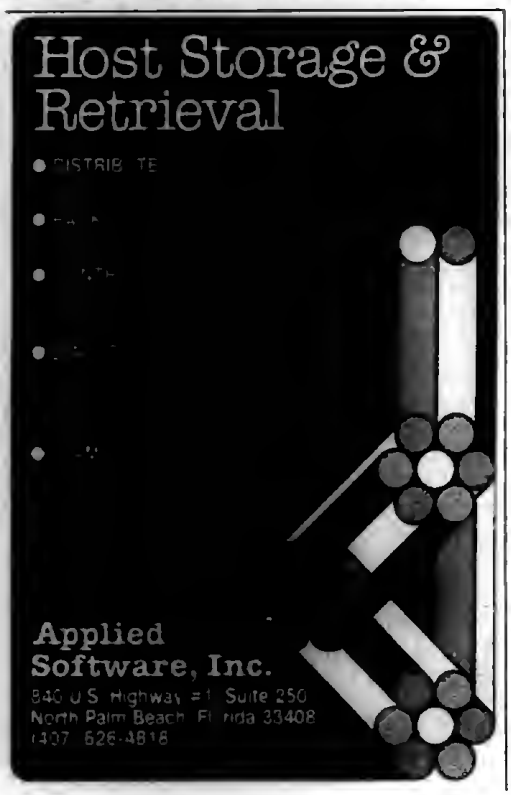
Case/Datatel, Inc. is the latest vendor to announce plans to support **AT&T's** Unified Network Management Architecture (UNMA). UNMA-compatible interfaces will be developed for all Case/Datatel console-controlled products, including nodal processors, network management systems, statistical multiplexers, modems and packet-switching devices.

Timeplex, Inc. announced that its Link/2 T1 switch has been tested and approved by AT&T for use with the carrier's recently announced Accunet Spectrum of Digital Service, including fractional T1 services, Timeplex said. AT&T's fractional T1 services are said to support transmission rates in bundles of 128K, 256K, 384K, 512K and 768K bit/sec. **Racal-Milgo, Inc.** has also announced support for **AT&T's** fractional T1 service through its Omnimux line of multiplexers.

AT&T recently signed agreements to form a strategic alliance with major Italian telecommunications equipment manufacturer **Italtel.** Under the agreement, the two vendors will develop, manufacture and market telecommunications equipment in Italy and throughout the world. AT&T will purchase a 20% interest in Italtel.

Banyan Systems, Inc. has unveiled two programs designed to "turn the halls of ivy into halls of Vines." Eligible schools can apply for a University Grant Kit at no charge. The kit includes two copies of Virtual Networking Software (Vines)/386, a set of software options, an applications tool kit and free hot-line access for six months. A wide-area network package is available for a minimal fee. The University Discount Program reportedly will save school administrators up to 50% off the list price. Details can be obtained by writing: University Program Manager, Banyan Systems, 115 Flanders Road, Westboro, Mass. 01581.

Excelan, Inc. has introduced Counterpart, a technology and product development program said to support the creation of network-oriented applications by software publishers. Targeting key software vendors, the program offers access to Excelan's networking technology as well as licensing and reseller agreements. Developers can also participate in Excelan's preproduction testing program.



Horwitt

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vendors' devices.

When you venture beyond the classic IBM environment is when you really get bogged down in overlapping and dovetailing functions. Vendors seem to feel that "front-end processor" is a good thing for a product to be, so we're seeing all kinds of anomalies introduced under the title. Able Computer just announced a "front-end processor" whose main purpose is to boost the line capacity of a Decserver. A useful device, but a far cry from the kind of product described above.

Of course, only IBM hosts really rely on their front ends to coordinate communications for them; everyone else could technically get along without. To avoid clouding the issue, let's keep the term "front end" for everything that sits in front of, and enhances the networking functions of, a host. Such devices can be called communications processors, systems, modules, platforms or just plain black boxes. The point is that while they rarely — if ever — meet the classic IBM definition of a front end, they still perform important "front end" functions.

For example, the channel-based host network has come a long way from the first proprietary boxes to connect two IBM hosts. Added capabilities introduced by Intel, Computer Network Technology, Network Systems and others include the ability to network a greater number of hosts; multivendor host support, often through agreements with software companies such as Flexlink; and support of network standards such as Ethernet and Fiber Distributed Data Interface.

That last item is important if you insist that a front-end processor must address user-to-host — not just host-to-host — connections. The Ethernet support particularly provides a cost-effective way for user workstations to hook into a channel-based network backbone, which typically costs $50,000 or $100,000 per connection.

Then we have Jupiter Technology's System 1000, Computer Communications' Data Express and Northern Telecom's Meridian Data Networking System — all extremely difficult to categorise but all multiprocessor, modular systems that are designed to link a variety of hosts to each other — and also to workstations and LANs — over remote T1 and X.25 links.

To further confuse the issue, we have Netlink, Inc., a company that lives literally in IBM's shadow (in Raleigh, N.C.) and was formed largely from former IBMers. Netlink's SNA Hub acts as a front end in the sense that it provides more flexible links between downstream device servers (Series/1s, multiplexers, modems and LANs) and multiple SNA-compatible hosts. It also acts as a concentrator, allowing multiple-device servers and applications to share the same line to the host.

Maybe the idea of pinning down front-end processors to a specific definition is not such a good one. I would rather praise third-party vendors that do the risky but important job of staying a step or two ahead of IBM and DEC — and hopefully prodding those big guys into enhancing their own communications products a little faster.

Horwitt is a Computerworld senior editor, networking.

Heinz

FROM PAGE 49

net LAN. These are linked to four DG MV/2500 DC host superminicomputers, one in each of the four corporate law offices.

The MV/2500 DCs, which feature 644M bytes of disk storage and either 16M or 24M bytes of memory, are tied together by a DG Ethernet LAN system customized for the Heinz installation.

The superminis communicate with one another and the workstations via DG's X.25 Xodiac transport system. All are connected by a LAN/WAN bridge from Microcom, Inc. in Norwood, Mass.

The network is completely transparent, allowing attorneys at one site to access data at another as though the offices were in the same building and linked by one LAN, McCabe said.

"We have a lot of need to communicate," McCabe said. "Before, this was done by telephone, fax, couriers and a great deal of travel." The only computers previously used by Heinz attorneys were stand-alone Wang Laboratories, Inc. word processors and a few Apple Computer, Inc. Macintoshes, all of which will be ousted by the DG hardware.

Heinz expects the network to pay off in reduced travel and paper generation, among other costs, to the tune of $200,000 a year. The increased productivity and newly gained access to outside databases such as the Westlaw legal database will cut expenditures on outside legal services by as much as $300,000, according to Heinz projections.

"The way we have designed the entire system, we'll be able to have much better control over the management projects," McCabe said. For instance, he said, "Right now two of our offices are involved in trademark litigation." When the network is fully implemented, "both offices will be able to review filings in those cases and transmit the data and documents back and forth much more quickly than now," he said.

> "THE WAY we have designed the entire system, we'll be able to have much better control over the management projects."
>
> LARRY McCABE
> H. J. HEINZ

Currently, the offices can print from one Wang word processor to a printer in another building via dial-up lines. But McCabe said this capability was seldom used because of its relative complexity and slowness.

The technology selection took more than six months, with McCabe and consultants from Coopers & Lybrand setting the criteria. Heinz's needs included improved document preparation, revision and flow; support and tracking of litigation analysis; access to outside databases; and an improved work-filing system.

Data General "had a good package that met our needs and was able to provide the kind of support we need," McCabe said. The legal application software was supplied by Orem, Utah-based Softsolutions Corp., an Authorized Data General System Distributor.

Fax boards

FROM PAGE 49

the ability of PC, electronic mail and telex systems to send and receive faxes via network service vendors. MCI Communications Corp. has already announced such a service, according to Eastern Management.

Future market revenues will not match the increase in unit sales, primarily because the average cost of stand-alone fax terminals will drop dramatically and because low-price units will represent the larger proportion of sales, Eastern Management said.

Total facsimile unit sale revenues will rise from $1.4 billion in 1989 to $2.1 billion in 1992, the study predicted.

PC fax boards, which sold last January at between $300 for 4.8K bit/sec. machines and $600 for 9.6K bit/sec. machines, should drop to between $200 and $500 by next January, the market research company predicted.

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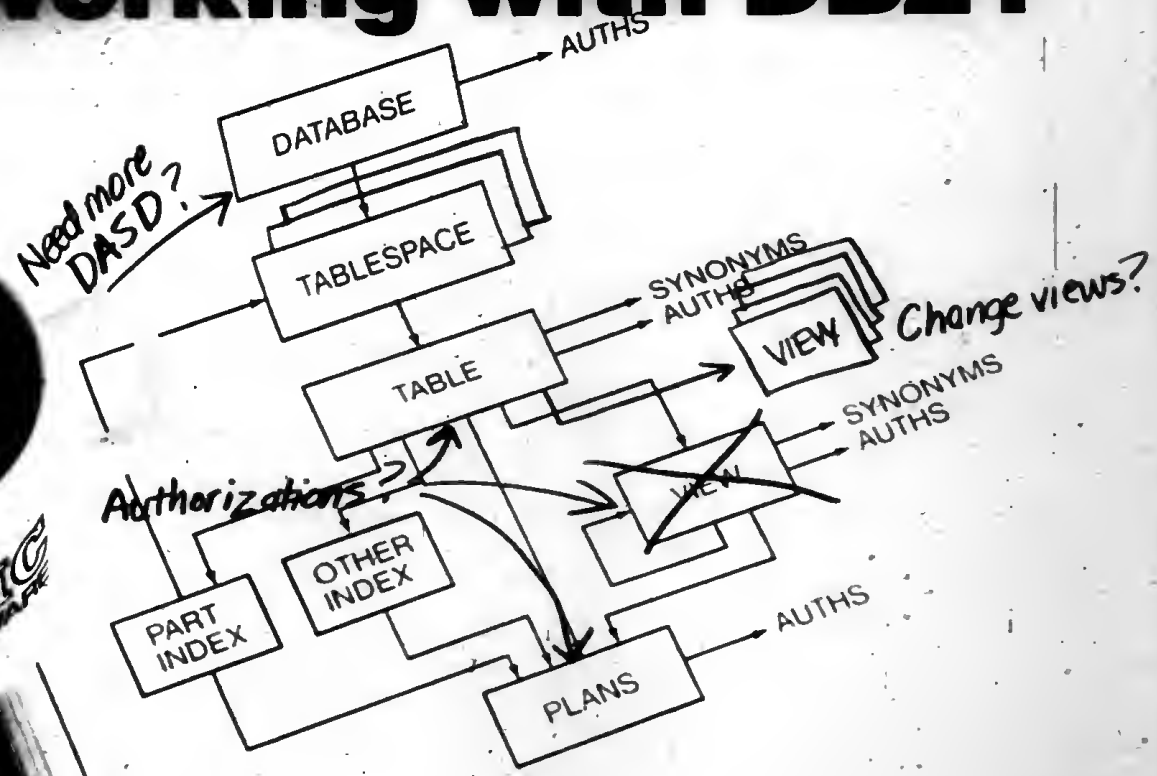

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CW

NEW PRODUCTS

Local-area networking hardware

A line of Unix-based desktop network servers has been announced by Motorola, Inc.'s Computer Systems Division.

The Delta Series 3000 Model 3200 network servers are based on the company's 68030 processor and reportedly deliver clock speeds of up to 25 MHz.

The systems accept up to three Motorola VMEbus cards each and come with up to 12 serial communications ports and one parallel port, the vendor said.

Pricing ranges from $7,495 to $19,785, depending on configuration and amount of storage desired.

Motorola
10700 N. De Anza Blvd.
Cupertino, Calif. 95014
408-864-4480

A combination hardware and software product that reportedly permits access to Ashton-Tate Corp. Dbase format files residing on a local-area network via a Touch-Tone telephone has been announced by the Automated Group, Inc.

Voicedb Version 1.1 is a remote database inquiry manager system that integrates telephone, digitized speech, text-to-speech and database technologies into a single user interface, the vendor said. The product runs on dedicated Intel Corp. 80286- or 80386-based AT bus-compatible workstations connected as nodes on the network. The Version 1.1 software with the two-board hardware package is priced at $4,995.

The Automated Group
P.O. Box 1386
Roswell, Ga. 30077
404-926-0407

Local-area networking software

Softklone Distributing Corp. has released a Microcom Networking Protocol (MNP) Level-5 add-in module for use with its Mirror III personal computer data communications software package.

Designed for MS-DOS PC users, the add-in product offers support for the MNP at Levels 2, 4, and 5 and enables Mirror III to communicate with other MNP-equipped remote systems. The module is priced at $31.95. Mirror III costs $99.95. Pricing does not include shipping and handling charges.

Softklone
Suite 100
327 Office Plaza Drive
Tallahassee, Fla. 32301
904-878-8564

Thomas-Conrad Corp. has introduced a software package designed to assist local-area network administrators in analyzing the performance of their networks and diagnosing problems.

Called TXD, the program reportedly operates under Novell, Inc.'s Netware Version 2.1 or higher and is scheduled for delivery in the second quarter. The product analyzes traffic-volume performance and identifies potential hardware failures, the vendor said.

It will be priced at $195.

Thomas-Conrad
1908-R Kramer Lane
Austin, Texas 78758
800-332-8683

Links

NBI, Inc. has added three network file and application servers to its line of networked computer systems.

The servers are based on AT&T's Unix System V, Release 3.0 operating system and include NBI's Officeworks networking and information management software package. The entry-level NBI 505 server can support as many as 32 IBM Personal Computer AT-compatible computers, Apple Computer, Inc. Macintosh machines or Unix workstations.

The NBI 505 *is an entry-level server*

The NBI 508 is available in 64- or 128-user versions, according to the vendor. The unit supports up to four 5¼-in. disk drives and has nine VME-standard expansion slots. The NBI 580XD reportedly provides a maximum disk capacity of 3.5M bytes and offers eight VME-standard expansion slots. The units are priced from $16,800 to more than $46,500, depending on configuration.

NBI
3450 Mitchell Lane
Boulder, Colo. 80301
800-922-8828

Mika, L.P. has announced Whisper, a communications hardware and software product designed for personal computer-based data security.

The product works over ordinary phone lines using Hayes Microcomputer Products, Inc.-compatible modems, the vendor said. It reportedly blends the Data Encryption Standard with communications features such as file transfer and terminal emulation and includes menu-driven software and a hardware-encryption module. The product supports Xmodem, Ymodem, Kermit and Zeta file-transfer protocols, the company.

Whisper costs $395.

Mika, L.P.
Suite 324
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PC Magazine, 10/31/88

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Booth Number 149

KEDIT is a trademark of the Mansfield Software Group, Inc.

Control Data Corp. has announced a series of network servers designed to provide file and compute serving for workstation users, the company said.

The Cyber 920 systems reportedly offer single and multiple reduced instruction set computing processor models for distributed processing functions and are aimed at users in the automotive, aerospace and research industries.

The single-processor, 16.7-MHz Cyber 920-161 and dual-processor, 16.7-MHz Cyber 920-162 are priced at $26,745 and $54,900, respectively. The two-processor, 25-MHz Cyber 920-252 and the four-processor, 25-MHz 920-254 are available now. The 950-252 will cost $74,900, and the 920-254 will carry a price tag of $99,900, according to the vendor.

CDC
8100 34th Ave. S.
Bloomington, Minn. 55425
612-853-8100

Customer-premises equipment

Northern Telecom, Inc. has announced the Centrex Integrated Services Digital Network (ISDN) Display Set, the M5209T.

The set is the latest addition to the company's line of Meridian 5000 series business sets and is available as a voice-only terminal or with either of two options that provide data services, the vendor said. One option reportedly provides packet service over the D channel at 110 through 9.6K bit/sec.

The second allows the user to choose between packet data over the D or B channel circuit-switched data at 110 through 19.2K bit/sec.

Scheduled for August availability, the Centrex ISDN Display Set will be priced from $435 to $580.

Northern Telecom
4001 E. Chapel Hill
Nelson Highway
Research Triangle Park, N.C.
27709
919-992-2788

Wang Information Services Corp. (WISC) has announced two products designed to complement its DVX-II voice processing system.

The WISCMail User Interface converts Digital Sound-based voice-mail system prompts to the interface used by Wang Laboratories, Inc., the vendor said. In addition, DVX-II can now be connected to Wang's traditional DVX voice-mail product via analog networking. WISCMail runs on any model of the DVX-II system and is priced at $906.

The analog networking software is scheduled for delivery this month and will carry a price tag of $1,725 per DVX-II node.

WISC
1 Industrial Ave.
Lowell, Mass. 01851
508-459-5000

Electronic mail

Electronic mail to be used with the Port Lite entry-level local-area network system has been made available by Waterloo Microsystems, Inc.

Port Lite Mail allows users to transfer mail messages within the LAN, according to the vendor. Features are said to include message filing, the ability to send copies and registered mail and an on-line directory of users. Available immediately, the price tag is $295.

Waterloo Microsystems
Suite 200
33597 Parkway Ln.
Norcross, Ga. 30092
404-441-9252

Modems

U.S. Robotics, Inc. has extended its Trade-In, Trade-Up program through June 30.

Owners of non-Unix System V.32 high-speed modems from Data Race, Inc., Hayes Microcomputer Products, Inc., Fastcomm Communications Corp., Microcom, Inc. and other companies can get a Courier HST Dual Standard modem by sending their modems to U.S. Robotics with $799.

The Dual Standard modem carries a regular list price of $1,595.

U. S. Robotics
8100 N. McCormick Blvd.
Skokie, Ill. 61176
312-982-5010

Telecommunications software that adds data compression and error correction to existing modems has been released by Magicsoft, Inc.

MTE provides an implementation of Microcom Networking Protocol levels found in higher priced modems. It is especially useful for laptop computers, the vendor said, as it ensures accurate file transfer in locations that may have poor telephone lines. MTE costs $79.

Magicsoft
P.O. 396
Lombard, Ill. 60148
312-953-2374

A 19.2K bit/sec. synchronous modem has been announced by Case/Datatel, Inc.

The DCM1900 was designed for use on four-wire, point-to-point private lines and includes trellis-coding capabilities, the company said. The unit reportedly measures 3½- by 8½- by 14½-in. and is priced at $1,995.

Case/Datatel
7200 Riverwood Drive
Columbia, Md. 21406
301-290-7710

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	89450	5000	FRI, FEB 20, 87
[illegible]192	20110	1000	MON, MAR 30, 87
360002	8585	0	TUE, FEB 10, 87
360003	15985	500	TUE, FEB 10, 87
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40	6	1	6	3.5	33
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60	6	4	9	6.5	83
70	7	4	10	7.0	85

* Computer Intelligence, January 1986.

The SAS System runs on Digital Equipment Corp.'s VAX™ series minicomputers and workstations under VMS™ as well as other mainframe, minicomputer, and personal computers.

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EXECUTIVE TRACK

Anthony Borruso has been elected vice-president and associate director of computer systems at **BBDO New York**, a New York-based advertising agency.

Borruso joined BBDO in 1983 as a senior analyst and became associate director of computer systems in 1986.

Before joining BBDO, Borruso was a senior programmer analyst at investment banking firm Dillon, Read & Co. for two years and a programmer with Bond Buyer electronic mail service for one year. He holds a bachelor's degree in computer science from New York University and resides in Newport, N.J.

Steven W. Broadbent has been appointed to serve as deputy assistant secretary for information systems for the **U.S. Department of the Treasury.** Broadbent will serve as the principal advisor to the assistant secretary for management on information systems issues.

Previously, Broadbent worked for AT&T in a variety of sales, sales management and network operations positions from 1982 to 1989. He received a bachelor's degree in nuclear engineering from the University of Virginia in 1976 and then served in the U.S. Navy until 1980.

He subsequently earned his MBA at the School of Business Administration at the University of North Carolina in 1982. In 1987, he earned a master's degree in public policy from George Washington University.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Speaks softly, carries a big stick

'Quiet persistence' with information systems at Dun & Bradstreet pays off for Field

BY CLINTON WILDER
CW STAFF

PROFILE: Michael Field

ANDY FREEBERG

Position: *Vice-president of customer information systems, The Dun & Bradstreet Corp.*
Mission: *To facilitate technology transfer, creative systems approaches and IS cost savings across the company's diversified business units*

Diversified, decentralized and dependent on information as its lifeblood, The Dun & Bradstreet Corp. poses unique challenges for its top information systems executive. Presiding over IS at the nation's largest information company is a mild-mannered British native who gets things done by what his boss calls "quiet persistence."

Michael Field, Dun & Bradstreet's vice-president of customer information systems, is the type of executive whose low-key style belies his impact on the organization. "Mike Field never seems to be at the center of a storm," says President and Chief Operating Officer Robert Weissman, "but if you look around where something is happening in this company, you'll find Mike Field there."

The power to influence and change is a critical IS success factor at the $4.4 billion New York-based firm, whose information products range from credit rating services to A. C. Nielsen Co. television viewing data. The biggest challenge, Field says, is getting culturally autonomous divisions — often formerly independent firms acquired by Dun & Bradstreet — to listen at the corporate level.

"Credibility and acceptance are the keys in an organization whose first instinct is not to turn to the corporate office," Field says with a slight laugh. "Usually that's the last thing they want to do. You have to earn credibility and not B.S. them, because only mutual respect will make it work. It's not having the corporate title that does it."

According to colleagues, Field has earned their respect in four years as top IS executive by knowing which buttons to push — both technical and personal. "Mike helps us understand the complicated business environment at D&B and helps us ensure that our network and computer services accommodate both present and future needs," says Allan Conner, president of Dunsnet, the firm's worldwide packet-switched network for both product delivery and internal use. "He provides me with a great deal of autonomy to react and make decisions. He leads on the broad strategic issues but is hands-off on the majority of the tactical

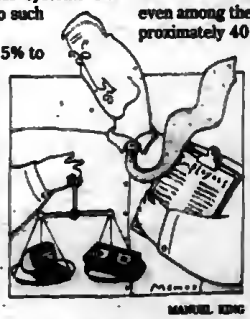
Continued on page 61

The fine art of seeking respect for IS

BY ALAN J. RYAN
CW STAFF

A company that is in the black financially today may not be there tomorrow. And a lack of respect for systems can contribute to such a downfall.

Right now, a scant 5% to 10% of corporate executives across the nation are truly enamored of technology, according to Brenda Lewis, a principal at Transaction Marketing, Inc. in Greenwich, Conn. Lewis said recently that beyond the Fortune 1,000, there are relatively few companies where the executives use technology at the top.



MANUEL KING

Lewis said that top management must accept technology as an asset on a par with cash, human resources and noncomputer technologies. But those who do are rare birds today, she said, even among the Fortune 1,000. Of approximately 40 people attending a recent speech by Lewis, just six said they believed their companies treated information technology with importance equal to other major portions of the business. Most agreed that only certain segments of their corporations treated information in this light.

"Just showing expensive systems purchases on the spreadsheet does not mean the information is treated as an asset," one attendee said.

If the company is to thrive, it must commit totally to technology change and the changing needs of customers and must allow for continuous education of all corporate constituencies as a central operating principle, according to Lewis.

"There is a long-standing lack of prestige for the information function," Lewis said.

At one time, she said, information technology was merely a reactive tool used to automate such functions as payroll and scheduling.

The advent of personal computers has brought about the attitude that information is an asset; now, she said, the challenge is to prove that it is an asset worth shouting about.

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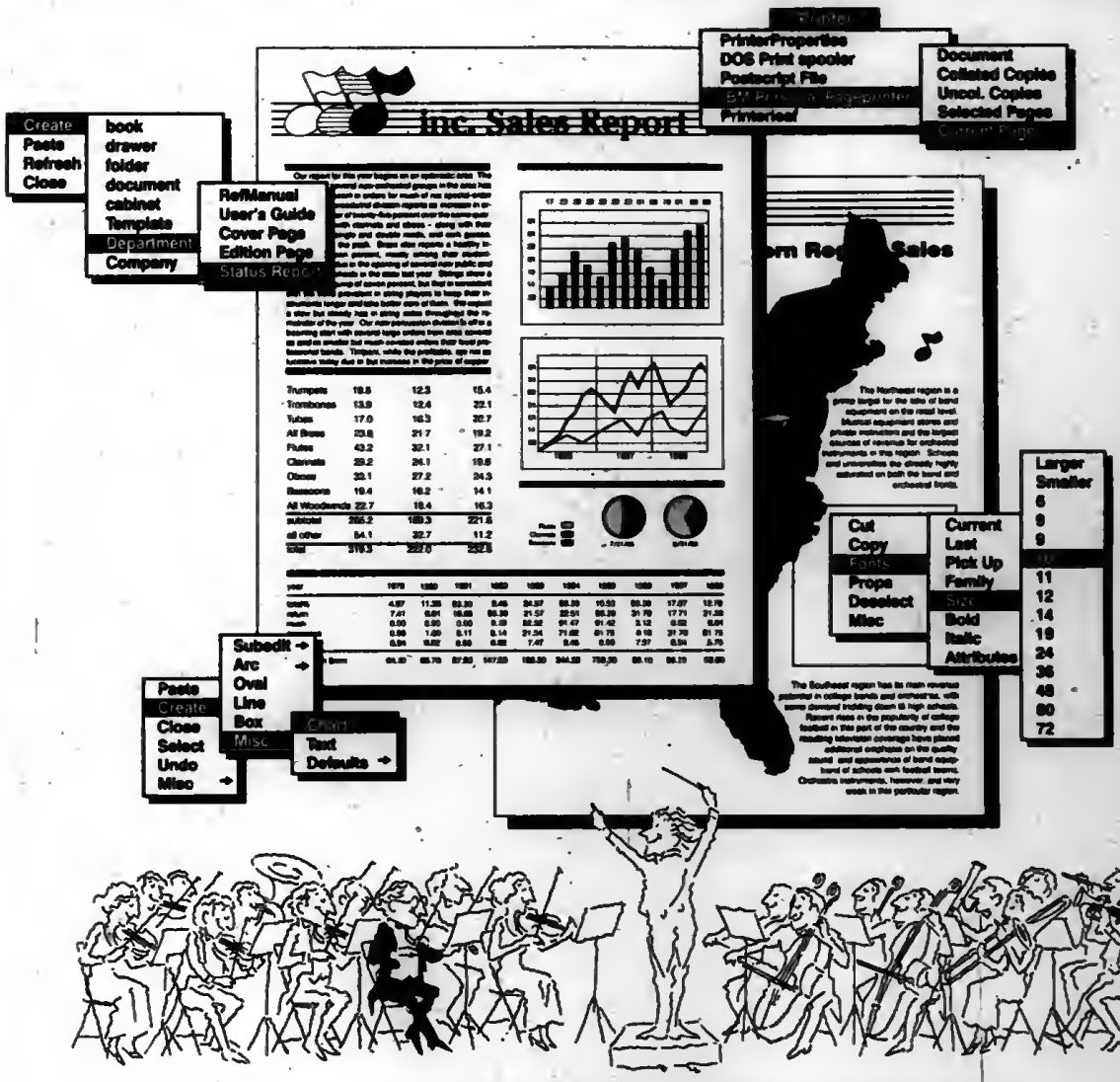

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CALENDAR

"The Strategic Management of Technology" will be the topic of a one-day workshop scheduled for Aug. 24 in Columbus, Ohio.

The workshop is sponsored by Battelle Memorial Institute, an international technology organization that serves industry and government by developing, commercializing and managing technology.

The workshops were designed to help middle- and upper-level corporate and government managers more effectively manage research and development programs and improve technology strategies. Battelle instructors will share their ideas on R&D organization and functions for the 1990s and present two case histories of applying forecasting methods for R&D decision making.

For more information, contact Diane Sotos at Battelle, 505 King Ave., Columbus, Ohio 43201-2693.

JUNE 25-30

Government Management Information Sciences Annual Conference. Virginia Beach, Va., June 25-29 — Contact: C. William Smith Jr., CDP, P.O. Box 6191, City of Virginia Beach, Virginia Beach, Va. 23466.

Marketing Problems and their Solutions. Chicago, June 25-30 — Contact: AMA Conference Dept., 250 S. Wacker Drive, Chicago, Ill. 60606.

Symsplasm Conference. Orlando, Fla., June 25-29 — Contact: AISP Symsplasm XVII, Suite 201, 104 Wilmot Road, Deerfield, Ill. 60015.

Intelligent Network Conference. Chicago, June 26-27 — Contact: Professional Educational International, Suite 740, 303 E. Wacker Drive, Chicago, Ill. 60601.

Object-Oriented Systems Symposium. Boston, June 26-29 — Contact: Digital Consulting, 6 Wasker St., Andover, Mass. 01810.

Summer Workshops for the Information Processing Professional. Nashua, N.H., June 26-29 — Contact: Ouellette & Associates, No. 66, 40 S. River Road, Bedford, N.H. 03102.

Multimedia & Hypermedia Exposition/Conference. San Francisco, June 27-29 — Contact: CSRI, Suite 100, 2900 Gordon Ave., Santa Clara, Calif. 95051.

National Forum on Computer Systems Security in the Information Age. San Mateo, Calif., June 27 — Contact: Kristen Horgan, Addamax Corp., Suite 300, 1355 Piccard Drive, Rockville, Md. 20850.

North American MAP/TOP Technical Forum. Ann Arbor, Mich., June 27-30 — Contact: Mark Lively, P.O. Box 1157, 2901 Hubbard, Ann Arbor, Mich. 48106.

Object-Oriented Data/Process Modeling for CASE. Los Angeles, June 27-29 — Contact: Rapid Systems Development, 211 W. 56th St., New York, N.Y. 10019.

Total Recovery Planning System seminar. Cincinnati, June 27 — Contact: CHI/COR Information Management, Suite 1550, 10 S. Riverside Plaza, Chicago, Ill. 60606.

Upcoming Telecommunications Opportunities in Europe. Washington, D.C., June 27-28 — Contact: BCR Enterprises, 950 York Road, Hinsdale, Ill. 60521.

Super-Intelligent Network Seminar. New York, June 28-29 — Contact: The Yankee Group, 200 Portland St., Boston, Mass. 02114.

World Tech '89. New York, June 28-30 — Contact: Aetec, Suite 906, 225 W. 34th St., New York, N.Y. 10122.

Strategic Resource Management Conference. Augusta, Maine, June 29-30 — Contact: Gigi Hathaway, State House Station 145, Augusta, Maine 04333.

JULY 1-14

International Symposium on Information Technology Standardization. Braunschweig, West Germany, July 4-7 — Contact: John L. Berg, Futuretech, 5 W. Glebe Road B-12, Alexandria, Va. 22305.

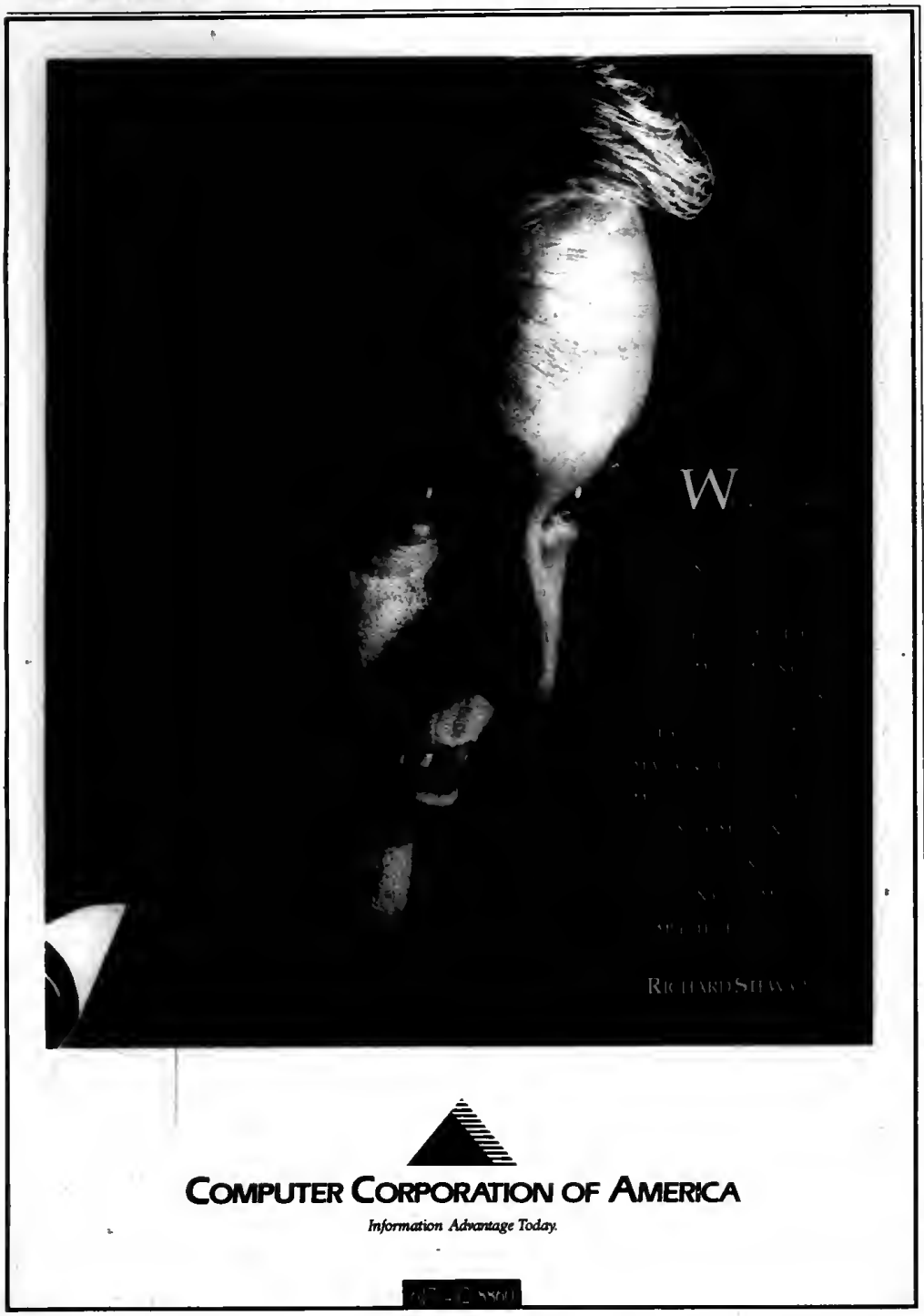
Security and Audit Conference. St Louis, July 9-13 — Contact: Cathy Piscunka, Computer Associates International, 711 Stewart Ave., Garden City, N.Y. 11530-4787.

Artificial Neural Networks Seminar. Santa Clara, Calif., July 10-13 — Contact: Institute in Computer Science, University of California Extension, Santa Cruz, Calif. 95064.

Desktop Presentation Graphics Conference. Los Angeles, July 11-13 — Contact: Cambridge Marketing, One Forbes Road, Lexington, Mass. 02173.

CICS Systems Management. San Francisco, Calif., July 13-14 — Contact: The Institute for Information Management, P.O. Box 361556, Milpitas, Calif. 95035.

Computer Software: Protection and Marketing seminar. San Francisco, July 13-14 — Contact: Practicing Law Institute, Dept. 8A-105, 810 Seventh Ave., New York, N.Y., 10019.



Field

FROM PAGE 57

issues," Conner adds.

To share his big-picture vision with IS counterparts in the business units, Field hosts an annual meeting for about 75 of Dun & Bradstreet's senior managers and IS directors with the goal of sharing as many ideas as possible. "It's a lot easier to communicate person-to-person than doing it through memos," he says.

Fostering communication is not always enough, however; sometimes, it takes the person at the top to see how one part of the huge Dun & Bradstreet IS organization might learn from another and save a costly development effort. Field believed that the data collection methodology for a rules database being used in the European credit services business, for example, could also be applied to Nielsen data collection in the U.S.

> "MIKE HAS been successful in getting others to do the right things."
>
> ROBERT WEISSMAN
> DUN & BRADSTREET

Field joined Dun & Bradstreet when the firm acquired his time-sharing company, Stamford, Conn.-based National CSS, in 1979. But the key to his climb to the top of IS was a trip back to his native London in 1983, where he headed a major revamp of the hardware and software infrastructure for all of the company's European businesses. That earned him the spurs to move into his present position four years ago.

"Everyone in a corporate staff job here has to recognize that you not only have to have the right answer, but you're only as effective as your ability to get people to agree with that answer," Weissman says. "Mike has been successful in getting others to do the right things."

Weissman discovered Field's persuasion skills early on. "He tried to convince me to look at an Amdahl Corp. mainframe when no one else was buying them," he recalls. "I told him no three times, but he kept overcoming my objections, and we bought the first commercial Amdahl machine ever sold."

Field is also responsible for making sure that Dun & Bradstreet replenishes its IS equipment stockpile as cheaply as possible — no small feat in a firm at which 15% of annual corporate spending, or about $150 million, goes for information technology. But in addition to thinking frugally, Field is making a big push to get divisional IS managers to think more creatively.

"There is technology out there today that allows you to take a different approach to designing systems," he says. "I'm trying to encourage all of our units to look at other than the obvious ways of designing them.

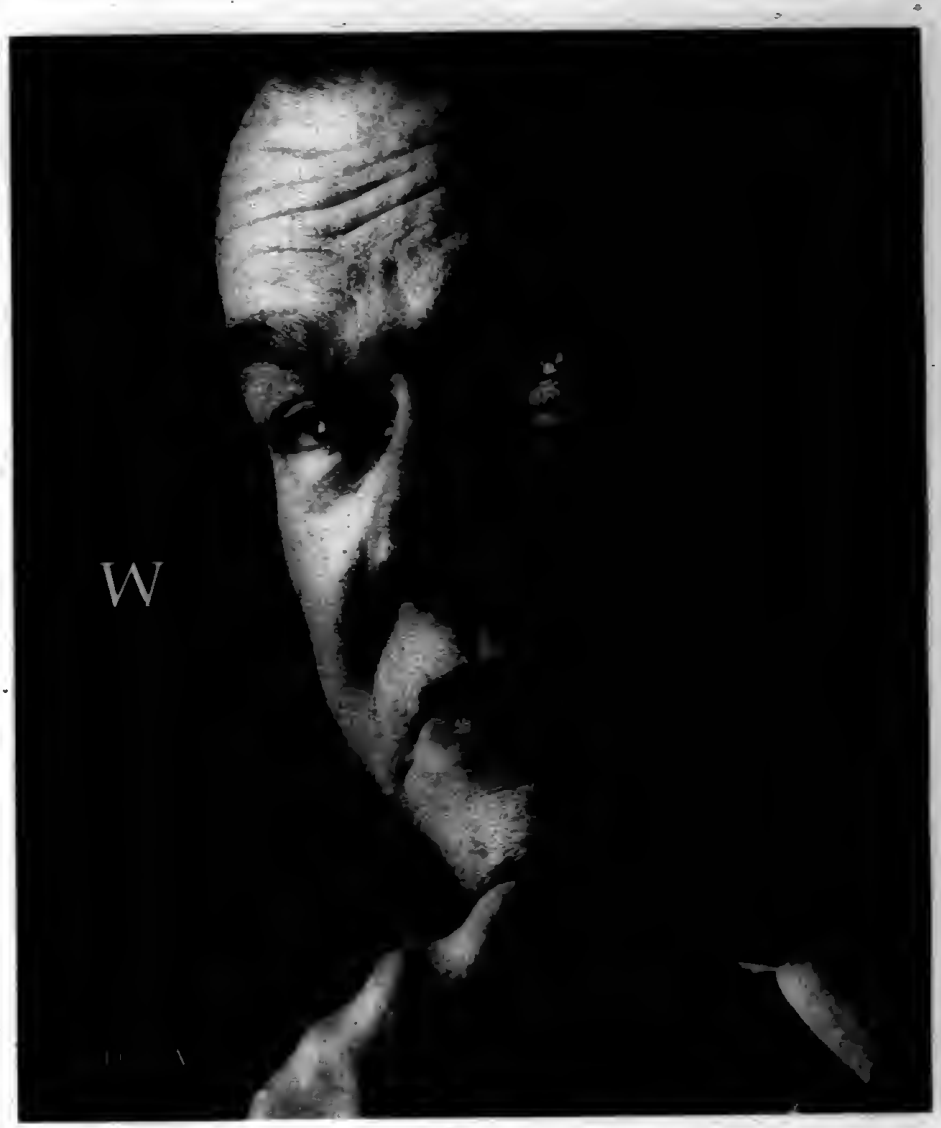
"In the long run, that's going to be more important than the millions we're able to save in equipment costs," he adds.

Field, now based in Wilton, Conn., began his computer career with IBM's British operation in London, concentrating on government systems. After four years there, he came to the U.S. to work in IBM's Cambridge, Mass., research lab for two years before joining National CSS in the start-up phase.

At the age of 48, Field still enjoys tennis and squash but has given up his former favorite sport of rugby. "I kind of miss it," he admits, "but I got a bit too out of shape to keep it up."

However, Field is pleased with the shape of Dun & Bradstreet's corporate IS function, which he firmly believes should leverage its corporatewide perspective to help transfer technologies and methodologies across business-unit barriers.

"It's business development, in a sense, when you see a particular innovation in one part of the company and say, 'This could really make a difference to our customers somewhere else,'" he says. "We've gotten to the point where [IS] is seen as a helpful area for the units to turn to for different help, facilitation and insight."



COMPUTER CORPORATION OF AMERICA

Information Advantage Today.

Global competition puts IS in spotlight

BY ALAN J. RYAN
CW STAFF

NEW YORK — Global markets in virtually every industry in the coming decade mean that companies must keep even closer tabs on what their competitors are doing — and information technology will play an increasing role in delivering that intelligence.

More and more companies are already putting competitive information on-line where it can be accessed anytime by anyone within the firm, said speakers at The Ruth Stanat Forum, Inc.'s seminar, titled "The Intelligent Corporation," here recently.

"There is a lot of information in file cabinets or in people's heads that isn't being shared," said Anita Goodnelt, a senior consultant at Strategic Intelligence Systems in New York.

Such on-line competitive intelligence systems, however, can be expensive, need user feedback and should examine not only what competitors are doing but also what they know about what your company is doing.

Such systems should include full-text clips or summaries of articles from trade press and general press, news from consultants, market studies, reports and rumors gathered by the sales force and others within the company, said Laura Hunt, manager of information access services at Digital Equipment Corp.

DEC currently has a 5-year-old competitor intelligence system with 10,000 registered users within the firm worldwide, Hunt said. The system is accessed 3,000 times monthly, she said, primarily by the sales force.

When information is collected from such diverse sources as help-wanted advertisements in local newspapers or from the manager of a local supermarket, the information has to make its way back to a central area before it can be useful, the speakers said.

Some companies have the sales force call in or fax the information and then enter it by hand or scan it into the system, while others have computers in the field where the information can be keyed directly into the system.

In some instances, knowing what the competition is doing can lead to better business decisions within your own firm, said Dennis Earle, vice-president of strategic planning at Bankers Trust in New York.

In banking, Earle said, the importance of a competitor intelligence system is not so much to find out what the competition is doing but rather to know what the competition knows about what you are doing.

Earle said that because any financial product can be imitated, a product must be out in the market 12 to 18 months before the competition introduces a similar product if it is going to be profitable.

But no system will be helpful if the users do not use it, Hunt said. DEC promoted its system internally by holding meetings with the sales force and publishing newsletters explaining the system's benefits, she said. It also encouraged user comments and feedback, so the system could be consistently reworked to meet their changing needs.

The usefulness of competitor intelligence systems must be assessed, Goodnelt said. If it is truly useful, she said, users should be able to answer yes to some of these questions: Did it help me to develop a new product? Was I able to reposition my products? Was I able to react more quickly to my competitor's eroding market?

Know your competitors

Within all corporations lies the means to collect competitive intelligence and disseminate that information to key decision makers, said speakers at the recent "The Intelligent Corporation" seminar in New York.

DEC's Laura Hunt, manager of information access services, presented these criteria for IS executives to implement a successful competitor intelligence system:

- Know your business so you can better understand what the users need from a competitor information system.
- Conduct a study to learn what kinds of information such a system must include.
- Find out who your users will be, how they plan to use the information and the format they expect the information to be in.
- Locate a highly placed technology champion to support the proposed system.
- Designate a project manager to work between the in-house people and outside vendors.
- Allow for systems growth — don't underestimate the number of potential users.
- Be responsive to users' needs by allowing for search techniques and the ability to retrieve integrated information.
- Be sure information is put into the system promptly and removed when no longer useful.
- Include a user-feedback mechanism.

ALAN J. RYAN

Unlocking mainframe resources: spreadsheets.

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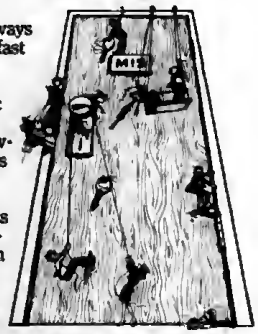

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MICROCOMPUTER DBMS

This contest requires a scoring system

BY JOHN LEBER

A war of two worlds is going on in the database management system marketplace, and the stakes are nothing less than ownership of corporate information management.

A host of shrinking mainframe products and a battalion of expanding personal computer products are meeting head-to-head in the Intel Corp. 80386 and local-area network server market. Relational mainframe and minicomputer systems are migrating to the PC platform at the same time that originally flat-file micro databases are adding relational and "pseudo-relational" capabilities.

Even at a quick glance, it is easy to see that something historic is happening. Oracle Corp. has announced Oracle Quicksilver, aimed at capturing a segment of the Ashton-Tate Corp. Dbase market. Software Publishing Corp.'s PFS:Professional File, strictly a flat-file product, now supports multiple indexes, data validation and "lookups" from other files, all normally features of relational products. Ashton-Tate's Dbase IV provides support for SQL.

DBMS vendors from both the traditional microcomputer and the large-system universes are trying to position themselves as the ideal providers of the true corporate database. The objective of both groups transcends current boundaries. It will not fit users' current conceptions of either mainframe or PC, even though the platform will be a micro. It will not be a mainframe product squeezed into a network server, nor a micro product stretched to fit an 80386. It will be a new beast and a large step toward seamless corporate computing.

The confrontation promises significant benefits for corporate DBMS buyers, as vendors of both types of products adopt some of the best features of the other group. Still, the collision is throwing off as many sparks that it is easy to be blinded and make the wrong selection.

Making a choice today is difficult. The theorists are still arguing. The relational model is in transition. The next incarnation of SQL is waiting in the wings. Benchmarks are deceptive, reviews are subjective, and mistakes are costly.

There are well-defined areas of product strengths, including transaction speed, fourth-generation language (4GL) and development tools, support for SQL and networking capability. However, those particular areas are not clearly related to implementation needs, and unfortunately there is no clear winner across the board.

The only safe path, at this point, is in carefully classifying and matching functional requirements and product capabilities.

Database management products can be broken into four functional components. By looking closely at these individual components, users can map product attributes against particular requirements. The functional divisions are as follows:

- **The back-end engine**, which handles disk I/O, reading/writing/finding, query processing/optimization, integrity enforcement and back-end processing.
- **The front-end processor**, which handles data manipulation and string/arithmetic/statistical operations.
- **The DBMS interface**, which consists of a data-definition language (DDL) and a data-manipulation language (DML), as well as the interfaces for both.
- **The programmer interface**, which embraces the application environment, 4GLs and precompilers and an embedded third-generation language (3GL) interface.

The DBMS engine, or back-end engine, handles all data access, whether a request is from an application written in a 3GL with an embedded request or directly from a menu provided by the DBMS interface.

Front-end processing relates largely to applications. Most database programming languages support data retrieval and storage in memory variables. Once the data is stored, the front end manipulates those variables.

The efficiency with which these manipulations are handled heavily affects both applications and complex report performance — a more important consideration if the planned use involves extensive reporting rather than transaction processing.

Front-end processing speed will become progressively more important as database programs become more intelligent. One way to implement intelligence is to use algorithms that are

Leber is head of Leber Enterprises, a Peoria, Ill., consulting firm.

INSIDE

Multiple choice
DBMS networking can have many shades of meaning. Page 64.

Almost the same thing
PC versions of larger DBMSs are close, but not exact. Page 69.

Less or more
Some like plain and simple. Others prefer the works. Page 70.

Contest

FROM PREVIOUS PAGE

capable of working with uncertainties. These algorithms are not only more demanding — calling for CPU-intensive array processing — but they also operate at the front end. The moral here is not to be unduly swayed by back-end performance alone.

In terms of DBMS interfacing, the DDL interface defines the database. DDLs create the database, including tables, indexes and constraints. The DML interface, in the absence of custom applications, manipulates the database. Both of these talk directly to the engine.

The programmer's interface is not limited to the database programming language. It includes any integration offered between a programming language and other components, as well as any programming conveniences provided. An example of the former is precompiler-type checking of program variables against the database dictionary; an example of the latter is project "make" facilities.

A proper perspective

Although the definitions of these functional components are all quite broad, they provide perspective for product evaluation. Approaching the process this way, it becomes clear that most vendors place heavy emphasis on engine speed not because it is important in most applications but because speed is easier to measure than some of the more crucial variables.

There are simply too many products occupying the new middle ground to discuss all of them separately. It is possible, however, to make some general statements about how micro converts and micro natives perform as classes in these functional areas. For simplicity's sake, the two groups will be discussed separately.

The mainframe and minicomputer programs migrating down are primarily relational products that use SQL for requests to the engine, both DDL and DML.

DBMS engine-level support for integrity rules are almost universally limited to intra-table integrity. The definition of referential integrity can be simplified to inter-table integrity.

A simple illustration of the potential damage that the lack of referential integrity can cause is the one-to-many relationship typified by a purchase-order "header" table and a purchase-order line-item table.

Without referential integrity, the engine will allow deletion of the header record, which usually contains vendor, date, shipping and other information, without deleting the corresponding line-item records. This leaves the line-item records useless.

The reason for the slow implementation of mainframe and mini DBMSs is quite simply that referential integrity incurs performance costs. Support will probably arrive as a subset of support for the enterprise model, in which business rules can be coded as database constraints and handled at the engine level.

Optimization is built into the back-end engines of these products, which use a data dictionary to pick the "best" indexes for a specific purpose and to decide whether to do sequential searches or make a temporary index. Not all optimization schemes are equal. For products supporting SQL, as well as query-by-example (QBE), optimization from best case to worst case in query design should be of far more significance than a flat benchmark.

In terms of DBMS interface, all of the mainframe-heritage products that support SQL inherently support a direct use of SQL as a DDL and a DML. The type, nature and completeness of a menued DBMS interface vary greatly among these products, however.

Similarly, although most products of this class support QBE, the degree of automation in this regard varies widely. In some products, a few keystrokes will generate a default form and bring up QBE mode. The interface translates the form entries into the appropriate SQL query, which is then forwarded to the engine.

The ease with which it is possible to perform complex manipulations varies with the product. Relational Technology, Inc.'s Ingres, for example, supports a menu-driven join operation, which includes generation of a default one-to-many form.

Report capabilities are almost universally excellent among DBMS products from the large-system environment, but report generation is manual. Default reports are very rough, and in order to make a polished report, a "system editor" (i.e., a program file editor) and an understanding of the respective and nontrivial report formatting language are necessary. The same comments apply to form generation.

Import and export are usually handled by utilities run after the memory-resident engine is loaded. Although powerful, these programs are uniformly unfriendly.

The common heritage of the mainframe products is most readily seen in the programmer interfaces.

These products have a precompiler, and the PC versions of the compilers are uniformly slow, awkward and annoying. One of the major problems is that these products still use an external word processor, instead of offering an integrated editor the way most DBMS products that have evolved in the micro world do.

Integration between the precompiler and the other DBMS components varies with the product, and this affects both development time and development style. For example, close ties to data and forms dictionaries for type checking are nearly universal among products coming out of the mainframe world, but they are less common among products that started out on micros.

Integration with the DBMS interface also varies. If a vendor's DBMS is sold separately from its 4GL, close attention needs to be paid to integration.

Informix Software, Inc., for example, sells separate packages: a DBMS (engine and DBMS interface) and a 4GL, both of which have the front-end

Continued on next page

MOST VENDORS place heavy emphasis on engine speed not because it is important in most applications but because speed is easier to measure than some of the more crucial variables.

Selection criteria

Which PC DBMS you choose depends on what components are critical to your objectives

Objective	Critical components
Simple high-volume transactions	Back-end engine
Complex high-volume transactions	Back-end engine and front-end processing
End-user freedom	DBMS interface
Emphasis on complex reports	Front-end processing
Multiple small applications	Programmer interface
Large application	Programmer interface, support for structured techniques

CW CHART / KIRSTEN DAHLE

Think networking when DBMS shopping

Like most complex technical subjects, networking databases is conceptually straightforward. Because the goal of a networked database is to allow multiuser access to the same data — not copies of that data — there are three basic approaches.

The first approach uses a conventional PC-based file server. This is the simplest and most vendor-independent approach. The database program runs entirely on the remote computer — usually referred to as a client — and the server acts as a virtual storage device. In this configuration, the server runs the network server program. Almost all of the micro database management system products that aspire to full corporate status handle networking this way.

The network appears to the DBMS as a local storage device. The DBMS deals with a database on a remote server exactly as it does with a local database: through the operating system. Concurrency is the only potential burden. The drawback to this approach is inherent to the concept — all of the disk I/O involved with a local disk file becomes network traffic. In a sequential search, the entire file is shipped from the server disk to the remote PC.

Multiuser approach

A second approach uses a conventional multiuser, multitasking system on the server and allows remote PCs to act as dumb terminals and communicate over the local- or wide-area network. Here, all processing is done on the server, including processing keyboard responses and coordinating screen displays for the remote computer.

This arrangement, most common among DBMSs written in multiuser operating systems such as Unix, has all of the benefits — and the liabilities — of a conventional host/dumb terminal setup.

Network traffic is kept low, because only the responses to queries traverse the network and processing is handled by the server. A major drawback is that the processing abilities of the client PCs are wasted.

One relatively new approach is to divide DBMS functionality between the server and micro, placing the DBMS engine on the server and the front end on the PC. All high-end DBMS products are currently taking this approach.

The benefits of this method of networked operation are considerable. A front end running on a PC can offer all the amenities to which PC users have grown accustomed, including direct video memory addressing for fast screen updates and intelligent keyboard processing for immediate field validations.

Network traffic is reduced to a minimum. Queries and responses have to shuttle only between the front end on the micro and the back end on the server, and translation of queries into appropriate back-end code can be accomplished locally.

Side effects

However, some significant negatives are associated with this scheme. One is that without additional DBMS software designed for nonnetworked operation, a network outage renders data physically unavailable, because the DBMS engine coded to work with and through a network is not the same engine used to work on a stand-alone basis.

A second problem is that the "ear" listening to the network at the server is no longer the network program but rather the DBMS back end. This means the DBMS back end, the network software and the network hardware must all support one other.

The major DBMS vendors supporting this arrangement regularly update the list hardware/software configurations supported, but the limitations are still very real. A change in network hardware or software can be made only if a version of the DBMS is available that supports the new configuration.

Common network services, such as electronic mail and file/printer sharing, are available only if supported by the DBMS/network hardware/network software combination.

None of the three approaches is "best." The first approach is generally least expensive; the second is well-developed and mature; the third, the most powerful. Whichever is best depends on the particular application.

JOHN LEBER

Contest

CONTINUED FROM PAGE 64

processing capabilities required for reports. Reports developed in the DBMS module cannot be directly incorporated into the 4GL source code, although large portions of the reports are reusable. This kind of split between the DBMS interface and the programmer interface increases programmer labor.

Seek structured support

Another area in which the differences in programmer interface can be critical is support for structured programming. For a large application, the maintenance advantages to sound software principles cannot be ignored and should be part of the selection criteria.

For example, the Oracle 5.1A programmer interface is based on application development by forms. Applications are developed using SQL*Forms, which incorporates "triggers," or fields on which either SQL statements or calls to other forms can be made, based on the value of the field. Although this approach offers high development speed, a potential liability is maintenance, because application flow is embedded in forms and not detailed in a source-code file.

Transportability is another issue that should be considered when evaluating a product's programmer interface. Right now, neither programs nor programming skills are easily transferable, even between SQL-based products.

Products with mainframe and mini heritage carry that past with them. Complexities such as support for the relational model and high-power, memory-resident engines have been ported to the PC platform. In these environments, however, they are coming head-to-head with products that evolved there.

The native microcomputer database products are specialists in user-friendly menus, flashy screens and other buzzers and bells. For these products, which were designed for single-user, single-tasking machines, such feats as direct video-memory addressing and direct keyboard processing are second nature. Concurrency, however, is a new challenge.

The back-end engines in the "upwardly mobile" products are usually incorporated into other components and definitely have a flat-file feel. However, at this stage, they are neither slow nor simple.

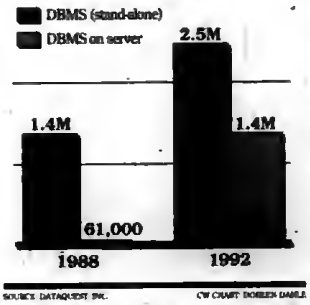
PFS:Professional File Version 2.0 is one of the simplest of these products. But it is still fast enough to work quite well with an 8,000-record 3M-byte table; whether that table is tiny, medium-sized or huge depends completely on perspective.

The engine supports nonunique indexed retrieval, unique indexed retrieval and even value lookups from other tables, allowing checks for existence in other tables prior to data insertion.

Heritage is hard to shake, however. The Dbase IV engine, for example, is a strange mixture of power and yesterday's philosophy. Index use is specified by the user, and only one index can be used for retrieval at a time, although up to 47 indexes can be automatically maintained. Indexed retrieval of nonunique multiple keys, however, is not supported.

Growing like a weed

Shipments of stand-alone PC DBMSs are projected to more than double in a four-year period

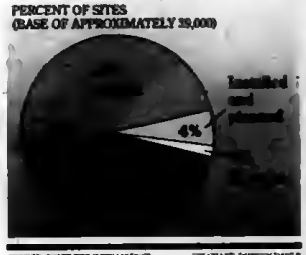


Front-end processing in the expanding micro DBMS products varies widely in both scope and power. On the high end, Dbase IV supports a full set of arithmetic, string and statistical functions, as well as two-dimensional arrays. In flat-file products without a programming language, calculations in reports and global file changes are usually accomplished with a kind of shorthand and proprietary code, often put in fields on a report form.

The DBMS interface is one area in which these products' heritage is a strength. The interface is almost always menu-driven, usually with online context-sensitive Help; as usual, power varies inversely with simplicity.

Split decision

Nearly half of IBM and compatible mainframe sites surveyed in January gave no indication of plans to use a PC DBMS



Some products do not have a formal DDL, strictly speaking; defining a form by a field name followed by a colon is sufficient. High-end products use a table-definition form but also support table creation and definition from their 4GL.

The drive behind QBE

The close integration between the engine and other components makes QBE the most common default query method, and very powerful menu-driven form and report generators are standard features.

In reports, as in front-end processing, the products without a programming language use a type of shorthand for specifying report complexities. Pushing products such as these to their limits, though, is a bit like programming the old programmable pocket calculators — by the time a "program" reaches 60 keystrokes, it is simpler to use a more advanced tool.

Import/export facilities are advanced and friendly, even in the simpler products. In the days when isolated PCs ran nonstandardized software, these facilities were virtually essential for a successful product. Support for fixed-field and delimited ASCII, DIF files and competitors' files are standard. The products with a programming language frequently allow full-screen report "painting," with menu-driven creation of labels, page breaks and derived columns — even printer control.

Programmer interfaces are a mixture of elegance, automation and shortcomings. Integrated environments are common, fast compilation (or precompilation) is the norm, but program-type checking is seldom accomplished against the database.

A major consideration with micro products is the abundance of third-party add-on packages, including program templates, documentation generators, program editors with help for each 4GL and other assistance products. In essence, the PC market is so easy to enter that any failings in a successful product are quickly fulfilled by third parties.

It should be clear by now that differences do still exist between products that grew up on micros and those that moved into the neighborhood fully grown. Micro-developed products are specialists at fast start-up and user-friendly approaches, and they are getting faster and more powerful. Mainframe-heritage products are powerful and becoming friendlier.

Eventually, the differences will disappear, and seamless corporate computing will become a reality. For now, bystanders will have to figure out how to match today's requirements and products without sacrificing tomorrow's options. ●

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Maryann DeSantis
Insurance Administrator
Strong Memorial Hospital
Rochester, N.Y.

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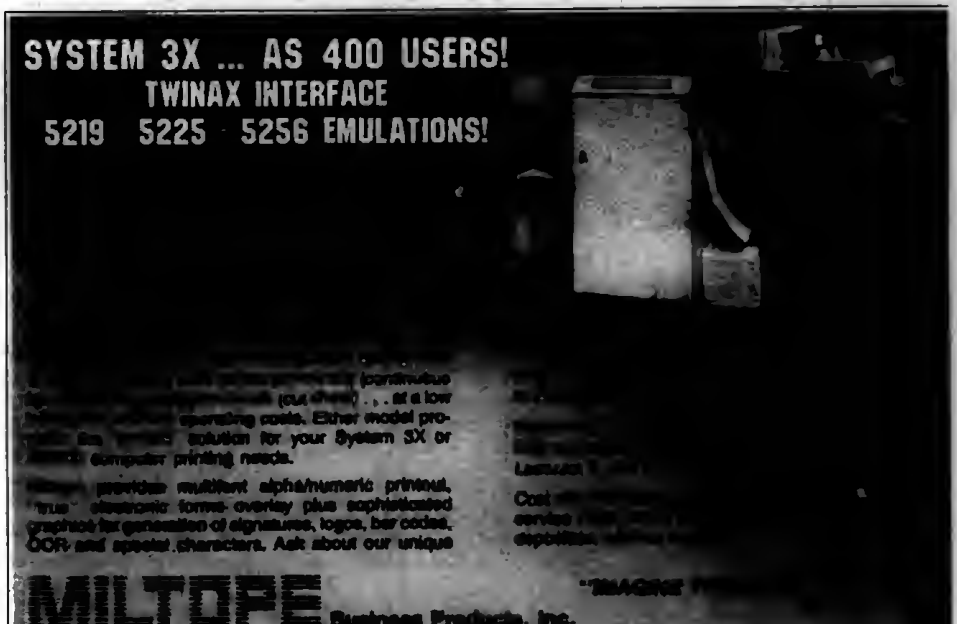

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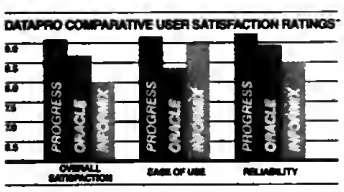

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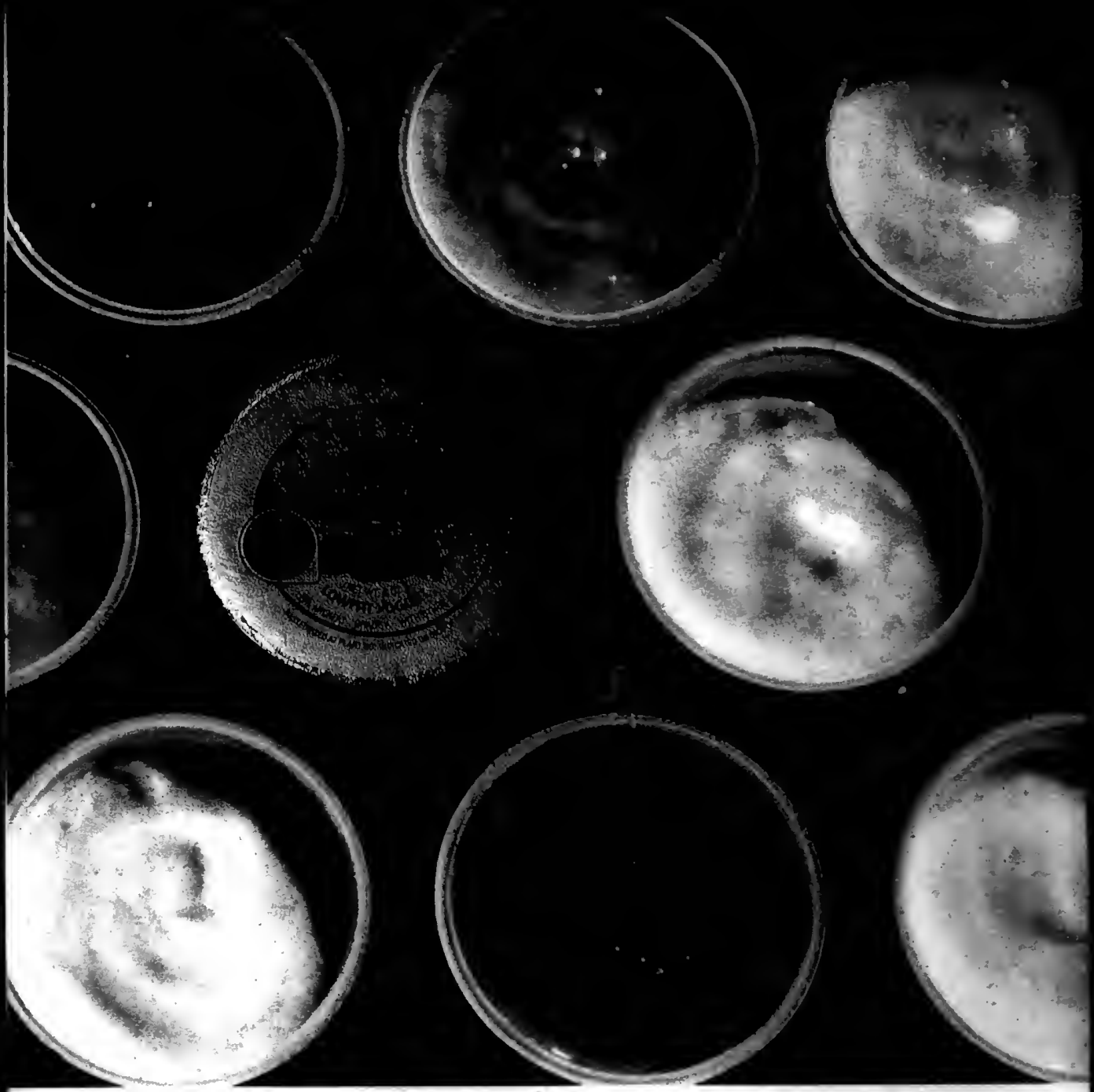

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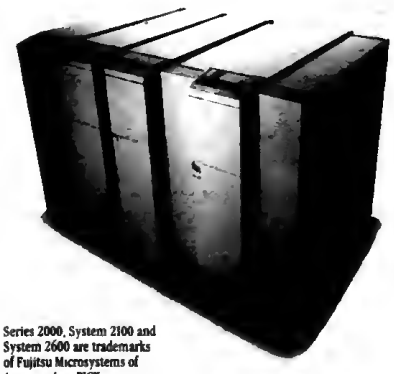

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Downsizing? Use caution

BY ANDREW TOPPER

There are several powerful arguments for taking advantage of the miniaturized versions of mainframe and minicomputer database management systems for development purposes, but a moment or two of quiet reflection is warranted.

Most mainframe vendors now offer personal computer-based versions of their own DBMSs and fourth-generation languages, and some third-party vendors have also built close approximations of the most popular large-system tools. Using these products for micro-based creation of large-system databases can help save money, time and CPU resources. Potential buyers of these products should be aware, however, that translations may not be exact and that using PC versions of large-system DBMSs may mean dealing with limitations and incompatibilities.

The large-system connections do not, for example, give these products any special immunity when it comes to constraints on memory and storage. Like most native micro DBMSs, these tools are generally limited to 640K bytes with standard DOS 3.0, and their disk file sizes typically fall below 32M bytes.

While some vendors support extended or expanded memory, most cannot overcome the DOS file allocation limits. Those that do get over the DOS hurdle have to rewrite the low-level assembler routines, at the expense of compatibility with normal DOS programs.

If the intended use is PC-based development of mainframe or minicomputer databases, compatibility with the large-system version is a critical issue. Identifying incompatibilities can help users decide how much additional effort will be required if they choose to download their development to PCs.

Some points to consider are differences in maximum record length between PC and large-system products, limits on multiple logical connections and the degree of difficulty involved with EBCDIC to ASCII conversion. All micro-based versions of large-system DBMSs — whether direct descendants or third-party tools — suffer from some or all of these problems.

Two products representative of the current state of compatibility are Information Builders, Inc.'s PC/Focus and Micro Focus' Micro Focus Cobol/2 IMS option.

PC/Focus was one of the original products to appear on the market offering development compatibility with a mainframe DBMS. The current version is compatible with most Focus applications but may balk if faced with one that is extremely large. Additionally, PC/Focus currently limits record length to 4K bytes, while the mainframe version allows records up to 12K bytes in length.

The current version of the Micro Focus Cobol/2 IMS option does not support multiple logical connections between databases. Other current IMS incompatibilities deal more with the behavior of an application than with its ability to be generated and run on a PC.

For example, when a sort is used in a PC Cobol program or an index on a PC IMS file, the ASCII values do not correspond exactly with the EBCDIC values. This variation can cause a difference in the way in which data is displayed or reported.

Solutions to many of these problems are either in the works or planned for future versions, but in the meantime, it is wise to ask yourself what level of compatibility between the mainframe product and the PC-based tool is necessary before you invest. •

Topper is president of Foresite Systems, s Lansing, Mich., consulting firm.

Mainframe/mini DBMS products available on PCs

Mainframe product (vendor)	PC product (vendor)
DB2/SQL (IBM)	OS/2 Extended Edition (IBM)
IMS/DL1 (IBM)	Cobol/2 IMS option, RealDL1 (Micro Focus, Realia)
Focus (Information Builders)	PC/Focus (Information Builders)
IDMS, ADS/Online (Cullinet Software)	The Application Builder (Online/Database Software)
Ideal (Computer Associates)	Ideal-Ecsort (Computer Associates)
Nomad (Must Software)	PC Nomad (Must Software)

CW CHART

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A DBMS that fits your needs

BY PAULA STONE

In advising "Suit the action to the word, the word to the action," Shakespeare was, I suspect, not referring to choosing between a flat-file microcomputer database management system and a fully relational product.

The general wisdom behind his words, however, can certainly be applied to the DBMS realm, in which both flat-file programs and sophisticated PC versions of mainframe relational products have their place. The rub, of course, is in suiting your product selection to your needs.

Do you trade a relational DBMS' long-term use for the ease of training and setup offered by a flat-file DBMS? When you pit the more authoritative, albeit slower, queries of full relational searches against the rapidity of flat-file searches, do you favor power or speed?

Laura Doperalski, PC training administrator at Minneapolis-based Best Buy Co., the fourth largest consumer electronics chain in the U.S., asked these questions when she joined the company last October and found its business managers struggling to stay on top of burgeoning sales from the chain's 41 retail stores.

What the managers needed was a fast, straightforward, easy-to-use tool for simple trend analysis and sales tracking. It was obviously inappropriate to provide terminal access to the systems running inventory, marketing and financial applications on the company's IBM 3081 mainframe. It would be too expensive and slow, and the abundance of information that would be heaped on them would go largely unused.

> DO YOU trade a relational DBMS' long-term use for the ease of training and setup offered by a flat-file DBMS?

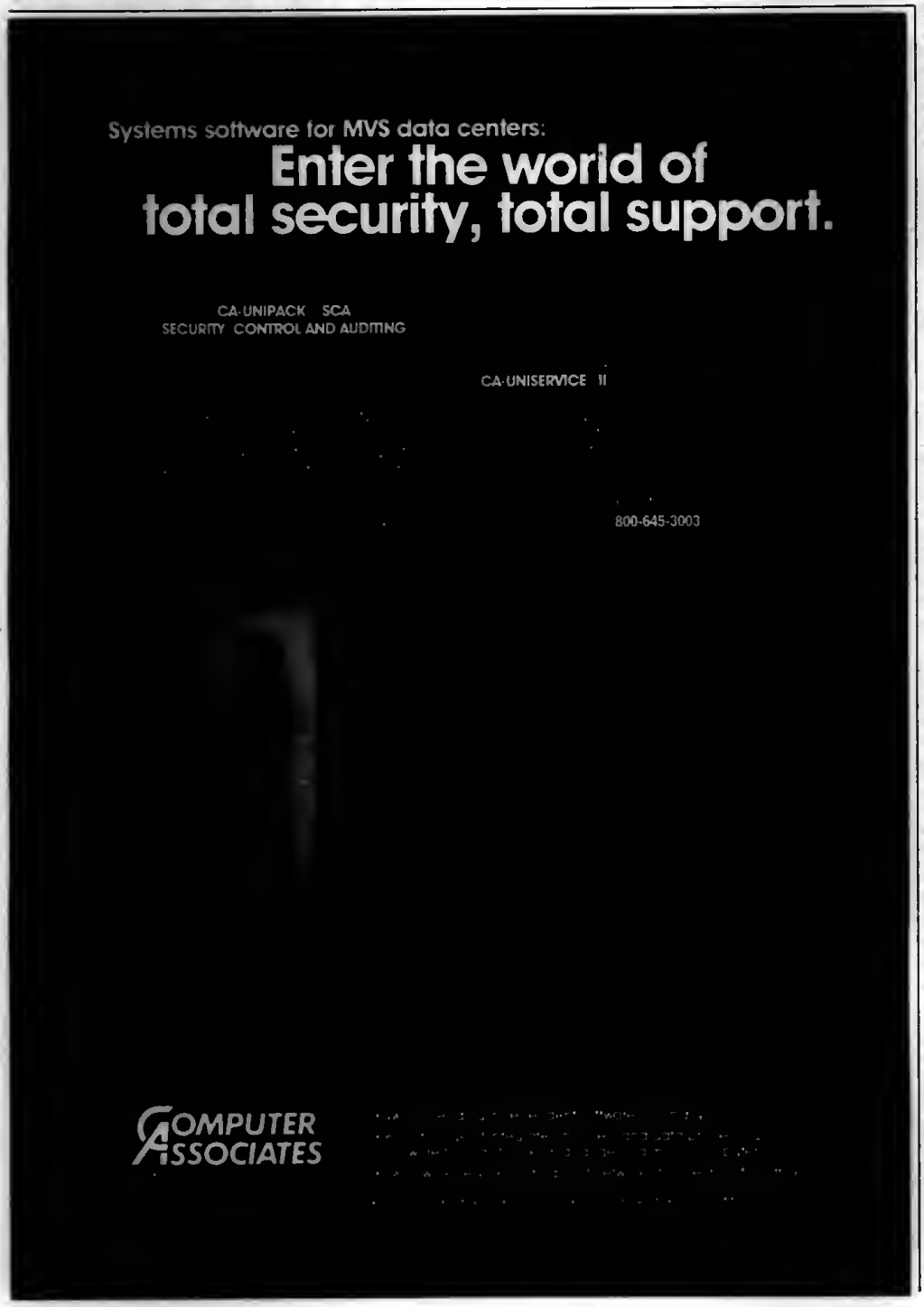
The Ashton-Tate Corp. Dbase IV DBMS used by the programming staff was too complex for the managers. They needed to focus on their area of interest; they needed information fast; and they needed flexibility in printing final reports. Also, the tool had to be compatible with the company's 300 IBM and Compaq Corp. 80286-based personal computers.

For Doperalski, the clear choice was a flat-file database. It was easy to use and provided speedy data searches. Selling for typically less than $200, it met the managers' needs in a cost-effective manner.

Best Buy purchased Software Publishing Corp.'s Professional File 2.0, which the marketing department had successfully used to develop a database to track and analyze its employee training and certification program. In addition to acting as a traditional flat-file DBMS, Professional File also pulls duty as a low-end relational DBMS, providing employees in training with information on their training and travel time.

The short learning curve of the flat file enabled users at Best Buy to quickly set up the database, making it easier to meet corporate sales goals. For example, using Professional File's application development tools, Best Buy built a sales-tracking database. The vice-president of marketing uses a vendor number from his sales and marketing database to locate a vendor in a vendor file. This allows him to learn more about a vendor

Stone is a free-lance writer based in Plano, Texas.



without accessing all the data in the sales-tracking database.

Professional File's relational capabilities allow Best Buy's vice-president of sales to track which products sell and at what rate, Doperalski adds.

Other companies have thrown their buying weight behind the more powerful fully relational DBMSs. In 1988, a Northern Telecom, Inc. manufacturing plant in North Carolina's Research Triangle Park selected Empress Software, Inc.'s Empress relational database.

Best Buy's Doperalski

"A number of databases had been announced at the time, but Empress was the only fully relational database available to run directly in the Unix environment," according to Jerry McKenzie, Northern Telecom's manager of information systems.

Empress was purchased to complement Northern Telecom's existing custom PC-based database system, which was running under QNX, Quantum Software Systems Ltd.'s real-time, multitasking operating system. Back in 1983, Northern Telecom, needing a database that could operate in a real-time, multitasking environment, wrote an engineering/manufacturing management program in C using Faircom's C Tree software development tool.

At the time, the database held a list of more than 10,000 components, including all the data operators needed for manufacturing assembly and quality. Hard-coded in C, it provided a number of predefined reports and relationships, and queries were executed very quickly, McKenzie says. However, the size of the database had nearly doubled since its creation.

The inability of the nonrelational system to immediately query new data or data relationships ad hoc was getting in the way of Northern Telecom's engineers and engineering managers, who needed an easy way to change a data segment's relationship to the whole, he explains.

Northern Telecom's solution was to port applications requiring fully relational capabilities to Empress running on 20 Intel Corp. 80386-based PCs running AT&T Unix V.3, Release 2. These applications, which initially reside on some of the more than 300 IBM Personal Computer AT's running under QNX on seven local-area networks, are linked via a homegrown terminal emulation link to the 386 machines.

For the mainstay of its business, Northern Telecom remains loyal to QNX. "Where we have not needed to migrate from C Tree under QNX, we haven't," McKenzie says. But he applauds "the use of 386-based PCs for bringing true relational capabilities for data management."

From Unix, users can access standard reports available under QNX or use SQL to perform advanced queries and produce reports. An operator can now query the system to learn how many boards will be affected and their names if one component is changed. Under Unix, Empress allows users who know a standard language such as SQL to generate a new type of report, McKenzie points out.

"This [report writing ability] allows a wider group of people to access the information more readily without having to be C programmers," he explains.

"Where we're at now is exciting," he adds. "We can now buy standard off-the-shelf word processing and spreadsheet programs that run under Unix to further increase productivity.

According to McKenzie, the use of PCs in the company's manufacturing operations has grown from one full-time and one part-time user to hundreds in five years. The entire unit has realised millions of dollars in savings. McKenzie sees databases on PCs as having played a significant role in this savings. •

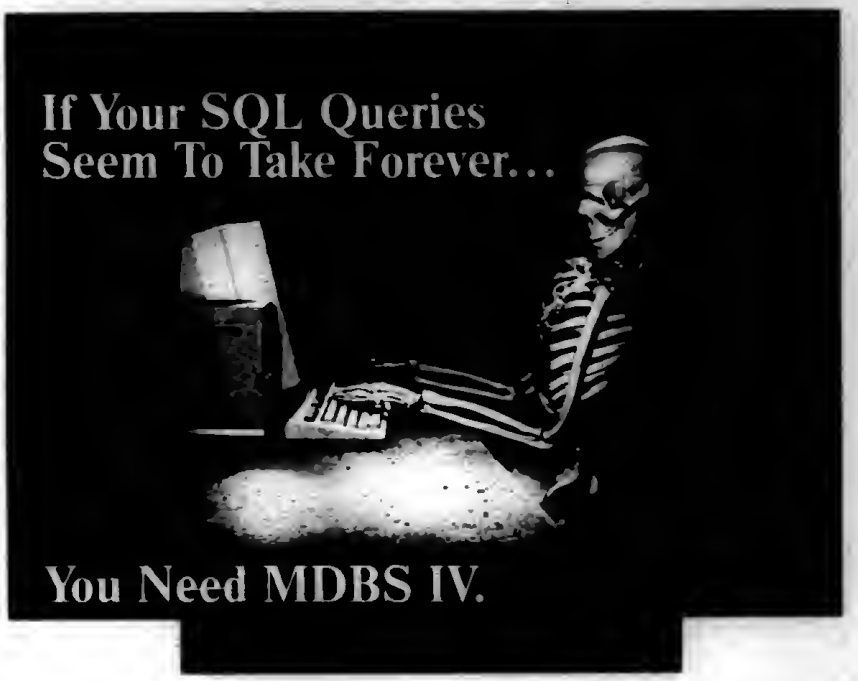
ASK THE VENDOR

I've been a user of Lotus' Symphony for a number of years and am impressed with its database capabilities. However, my application is very large and is sometimes limited by the amount of random-access memory available. How does Lotus plan to address memory management in future versions of Symphony?

Daniel Fischer
President
Micro Realities
Macon, Ga.

LOTUS DEVELOPMENT CORP.: Symphony 2.0 requires 384K bytes to operate and 512K bytes of RAM if the spell-checker and other large add-ins are invoked. As you know, all MS-DOS-based products are limited to working within the 640K-byte environment unless certain memory management technologies are implemented. Currently, Symphony is designed to support the Lotus/Intel/Microsoft Expanded Memory Specification technology, which allows users to access more than 640K bytes of RAM.

While it is our policy not to comment on unannounced products, we are committed to Symphony and will continue to support existing and potential customers' needs for better memory management.



Performance.
MDBS IV provides the superior performance that your on-line, mission critical applications require. Even on a microcomputer LAN with dozens of concurrent users, MDBS IV can access multiple gigabyte databases and offer sub-second SQL query response times.

Integrity.
MDBS IV also provides features such as abortable transactions and two phase commits, which protect the integrity of your database. In addition, the very nature of MDBS IV's treatment of data relationships guarantees referential integrity.

Client/Server Architecture.
Today many DBMS vendors are claiming data base server technology is new. We installed our first data base server in 1984. With 150,000 installations worldwide, we have perfected what others have only begun to explore.

Portable.
MDBS IV is available on a wide range of micros, LANS, minis, and work stations. It is also being ported to the mainframe environment.

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MDBS IV is one component of the mdbs Technology Platform. This platform is woven of products and services designed to work together to provide a powerful, synergistic approach to applications development. Components of the mdbs Technology Platform include expert systems, relational DBMS, object oriented tools, consulting, support and training.

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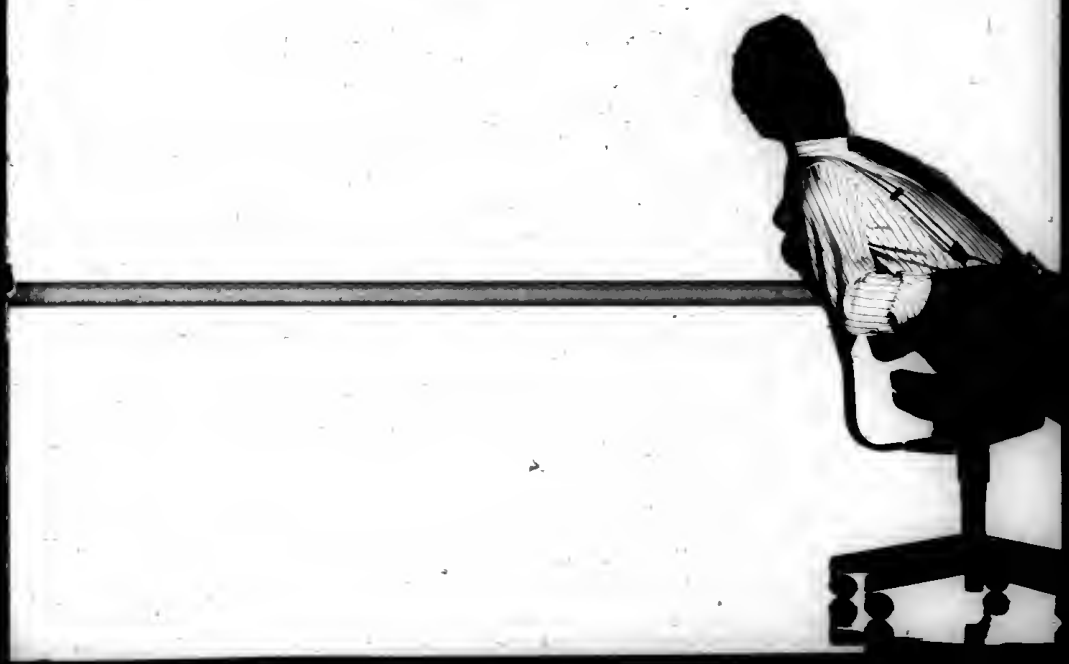
Relational microcomputer DBMS

COMPANY	PRODUCT	SINGLE OR MULTIUSER	OPERATING SYSTEMS	MEMORY REQUIREMENTS (IN BYTES)	ADDRESSES MORE THAN 64K BYTES OF RAM	VERSION OF SQL	IS SQL INTERACTIVE OR EMBEDDED?	IMPORT/EXPORT FILE FORMATS SUPPORTED	RECORDS PER TABLE	FIELDS PER RECORD	CHARACTERS PER FIELDS	FILES THAT CAN BE OPENED AT ONE TIME	DATA DICTIONARY/SYSTEM CATALOG	LANGUAGES SUPPORTED	WINDOWING FACILITIES SUPPORTED	NETWORKS SUPPORTED	PRICE
Advanced Information (415) 366-8600	DB Magic	Multiuser	HP proprietary	1M	Yes	Proprietary	Both	ASCII	Unlimited	32,767	32,767	Unlimited	Yes	Basic	None	Shared Resource Management	$1,495
Aber Corp. (714) 250-1718	Magic PC; Magic LAN	Both	DOS	512K-640K	Yes	None	NA	ASCII	*	2,000	2,000	15	Yes	C, Basic, Pascal, Cobol, Fortran	Built-in windowing environment	Novell, 3Com	$299-$699 (runtime, $99-$499)
Applied Software Technology (800) 678-1111	Versabase III	Both	MS-DOS	512K	No	None	NA	ASCII	8 million	148	160	2	No	Pascal, proprietary	None	Novell, 3Com, IBM, Banyan	$245-$495
Ashton-Tate Corp. (213) 329-8000	Dbase IV	Both	DOS, OS/2	640K	No	IBM SAA	Both	DBF, DIF, SYLK, ASCII, 1-2-3	1 billion	254	254	99	Yes	Dbase, C, Assembler	NP	Novell SFT Netware, 3Com 3+, Net/One	$795 (runtime: $1,295)
Blyth Software, Inc. (415) 571-0222	Omnis 5	Both	DOS, OS/2, Macintosh	300K	Yes	CL/1, SQL Link	Interactive	DIF, SYLK, Dbase, DBF, WK3	*	255	32,000	60	Yes	Pascal, Assembler, C	MS Windows, OS/2	Any Netbios-compatible	NP
	Omnis Quartz 1.2, 2.0	Both	DOS	300K	Yes	None	NA	DIF, SYLK, Dbase, Lotus	*	Unlimited	2,400	60	No	Pascal, C	MS Windows	Any PC-compatible	$795-$1,495
Borland International (408) 439-1472	Paradox 3.0	Both	DOS, OS/2	512K	Yes	ANSI Levels 1 and 2	Both	Dbase; PFS File; DIF; ASCII, Symphony, 1-2-3	2 billion	255	256	Unlimited	No	Paradox Application Language	None	Banyan Vines, 3+, Novell, AT&T Starlan	$725 (runtime: $29.95)
Business Tools, Inc. (800) 644-2015	TAS-Professional 3.0	Multiuser	DOS 3.11 or higher	512K	Yes	None	NA	Dbase III+, Text	*	4,000	255	32	Yes	Proprietary	None	Any Netbios 3.1-compatible	$499-$999 (runtime: $1,000-$1,299)
Compaq America (618) 539-8506	Paqe DMS Micro, Paine DMS Microset	Both	DOS, OS/2 unprotected	640K	No	None	NA	SYLK, WPS	9,999,998	255	255	3	Yes	Basic 6.0	MS Windows	PC Network, Novell, 3Com	$495-$1,495
Chang Labs, Inc. (408) 248-8688	C-A-T	Single	Macintosh	1M	No	Proprietary	Both	ASCII	*	Unlimited	Field determined	Memory dependent	No	None	Apple	Tops, Appleshare	$300.95
Clarion Software Corp. (305) 785-4555	Clarion Professional Developer	Both	DOS, PC-MOS	512K	No	None	NA	Dbase, DIF, Basic, ASCII	*	Unlimited	64K	252	No	Proprietary	None	Novell, 3Com, Banyan, PC LAN	$695
Command Business Systems, Inc. (714) 250-7231	Structure/A	Both	DOS 2.1	640K	No	Proprietary	Interactive	ASCII	*	Unlimited	32,000	DOS limit	Yes	CWIC 4GL	Proprietary	None	$1,195
Compuware (313) 737-7850	Powerbase	Both	DOS 2.0	384K	No	None	NA	ASCII, Dbase II and III, DIF, Multiplan, 1-2-3	65,534	64	15-80	10	No	None	Desqview	Novell Advanced Netware; IBM PC LAN	$349-$495
Conceptual Software, Inc. (713) 827-1333	Profile	Single	DOS, Unix, Xenix, DEC VAX	320K	No	None	NA	Dbase, Lotus, ASCII	*	1,000+	200	Unlimited	No	Proprietary	None	Novell	$720
Condor Computer Corp. (312) 971-6880	Condor 3 Release 2.20	Single	DOS	128K	No	None	NA	ASCII	65,534	127	1,024	1	Yes	None	None	Novell, 3Com	$495 (runtime: $100)
Control Data Corp. (612) 853-6137	M/Personal	Multiuser	DOS	512K	Yes	None	NA	DIF, ASCII	*	150	80	20	Yes	None	NP	DOS	$485
CXI, Inc. (408) 988-6688	PC Relate	Single	DOS	2M	Yes	ANSI Level 1, proprietary	Interactive	OS files	*	32,767	999	Unlimited	No	Pascal, FTV, C	None	Decnet	$245 (runtime negotiable)
Data Access Corp. (305) 593-6913	Dataflex 2.3	Multiuser	DOS; Unix; Xenix; OS/2; DEC VAX/VMS, CP/M	384K	No	None	NA	Dbase, DIF, SYLK, ASCII	16.7 million	253	255	250	Yes	Dataflex, C	None	Vines; AT&T Starlan; 3+; Netware, Advanced Netware	$695-$1,250 (runtime: $300-$300)
Database Applications, Inc. (609) 924-2900	4GL/r Relational DBMS	Single	DOS 2.1	256K	No	Proprietary	Interactive	ASCII, DBF, SDF	*	32	800	16	Yes	NPL 4GL	Desqview	Novell, IBM	$95 (runtime: shareware)
	NPL/R Plus Release 3.2	Single	DOS 2.1	384K	No	Proprietary	Interactive	ASCII, DBF, SDF	*	254	10,000	40	Yes	NPL 4GL	Desqview	Novell, IBM	$595 (runtime: $150)
Datamax International, Inc. (800) 274-0949	Datamax 4.0	Multiuser	DOS	640K	Yes	None	NA	Lotus, Dbase, DIF, ASCII, Wordperfect, Multimate	2 billion	255	256	100+	No	None	None	Novell, 3Com, Banyan, AT&T, IBM	NP
Empress Software, Inc. (301) 220-1919	Empress	NP	Unix, VMS, DOS	1M	Yes	ANSI Level 1	Both	Proprietary	2 billion	2 billion	2 billion	Unlimited	NP	C, Fortran	Sunview, X Window	NFS, RFS, Decnet, Apollo Ring	$1,250
Fox Software (614) 873-0900	FoxBASE/A	Both	DOS, OS/2, Xenix	640K	Yes	None	NA	Dbase II, III; Condor; Lotus; ASCII; PC File	1 billion	384	383	384	Yes	Pascal, Basic	Proprietary	Novell, Banyan, 3+, Starlan, IBM PC Network	$695
1st Desk Systems, Inc. (800) 533-3366	1st Key	Multiuser	Apple Macintosh OS	1M	Yes	None	NA	Flat-file, SYLK, DIF, TAB	2 billion	255	255	1	Yes	None	Macintosh	Appletalk, Localtalk, Tops	$795
Fox Software, Inc. (614) 873-0900	Foxbase	Both	DOS, Macintosh, Unix, Xenix	300K-DOS; 600K-Macintosh	Yes	None	NA	SDF	1 billion	128	254	48	Yes	Dbase	None	Netbios, Appleshare	$300-$700

*Limited by disk space only

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

Digital announces a new line of products which brings the proven superiority of distributed computing to a totally new level.



Introducing the world's most powerful desktop computers.

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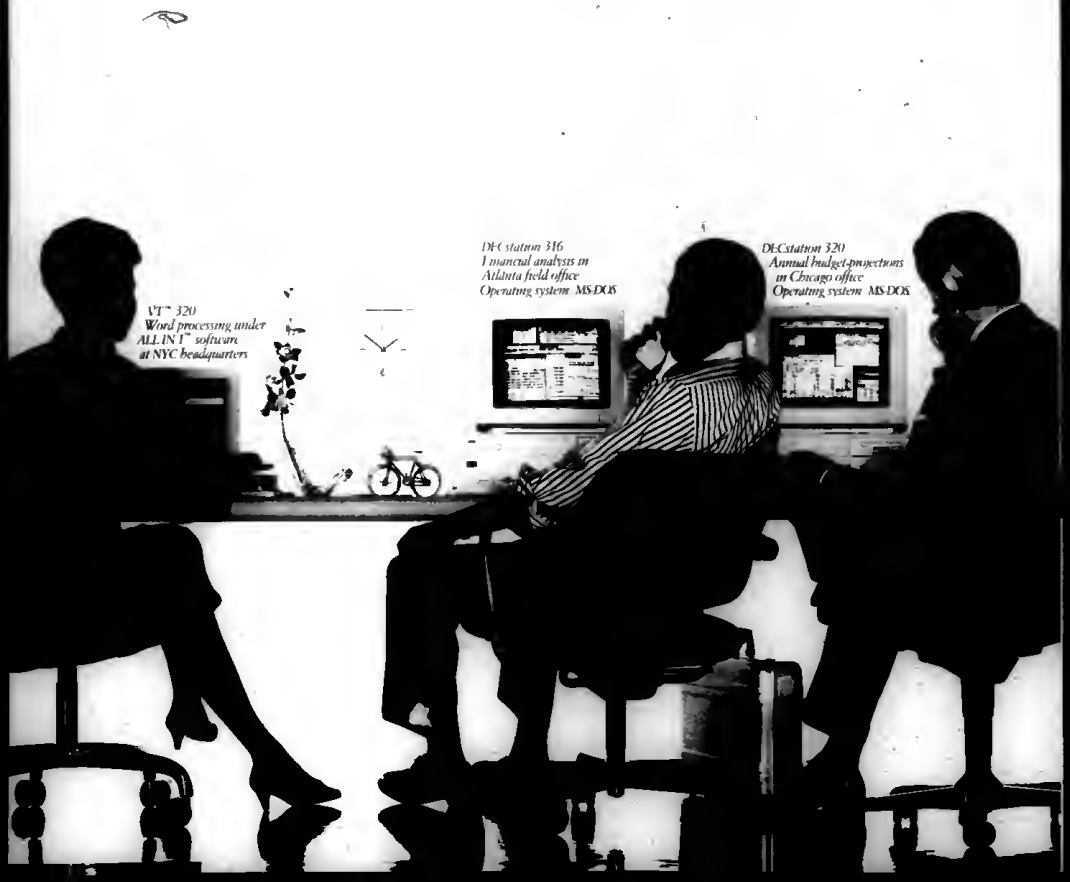
Powerful new hardware.

For PC users, there's the DECstation™ 210, 316 and 320 systems – the first industry-standard PCs sold and supported by Digital.

For UNIX® users, there's the DECstation 3100 workstation. Its state-of-the-art RISC technology makes it the fastest desktop workstation in the world today.

For those who want it all, there's the VAXstation™ 3100 workstation. It's a VAX™ workstation that runs the VMS™ operating system and industry-standard UNIX and can run MS-DOS™ applications as well. Its price/performance is triple the world's best-selling workstation – our own VAXstation 2000.

To complete the picture, there's the VAXstation 3520 and 3540 systems. They give you all the power you need in 2-D and 3-D graphics workstations.



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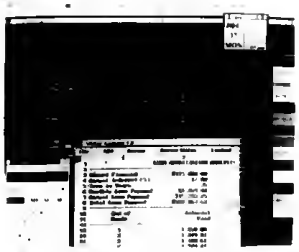
Powerful new software.

Our new DECwindows™ desktop software, part of Digital's Network Applications Support,™ offers something no other windowing system can. The ability to access applications across operating systems.



With DECwindows software, you can display VMS, UNIX and MS-DOS applications at the same time.

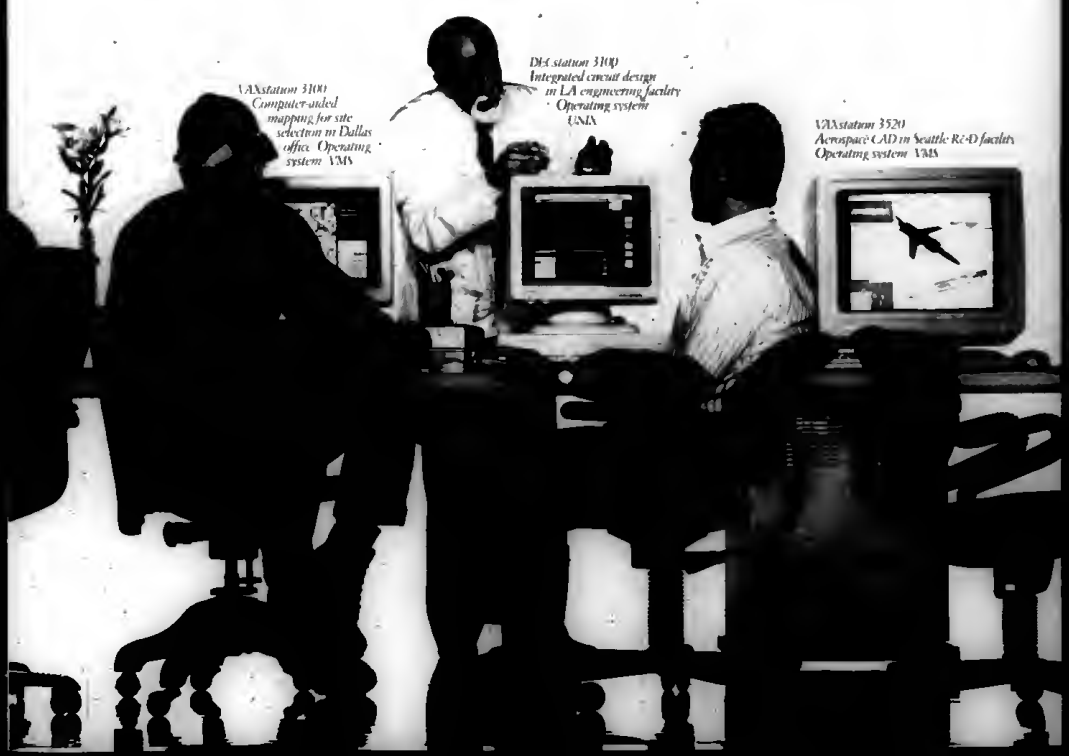
Imagine the possibilities. If your desktop computer runs the VMS operating system, you can display VMS applications, plus applications from any UNIX or MS-DOS computer. The same is true if you're running a UNIX system. Whether you're a user or an applications developer, with DECwindows software there's one, easy-to-use interface that's the same across operating systems. You can display text, graphics and imaging all at the same time.

Behind it all, standards.

Our ability today to offer such total, systemwide integration comes from years of experience working for a single goal. To make it easy for people to work together. And that demands an adherence to standards.

It's why we've taken a leading role in standards bodies, championing the adoption of open standards. It's why we're the leaders in networking, with more multivendor networks than anyone else. And it's why we back up our products with worldwide, world-renowned service.

Now, with our family of desktop computing systems that lets information be shared from desk to desk anywhere in the world, we'd like to show you how much more productive everyone in your company can be.



Now anyone can have a window office.

With DECwindows software on a VAXstation 3100 workstation, getting the whole picture is easier than ever

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Our new DECwindows desktop software, part of Digital's Network Applications Support, opens up a whole new way to look at windows. Because it lets you do the one thing no other windowing system can – share applications across operating systems.

Here's how it works.

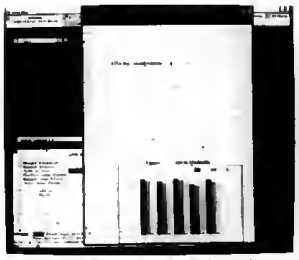
If your desktop computer runs the VMS operating system, you can display VMS applications, plus applications from any UNIX or MS-DOS computer. The same is true if you're running a UNIX system. You even have access to applications running on large computers like VAX, IBM® and Cray systems.

The beauty of it is, it isn't complicated. DECwindows software makes it very simple.

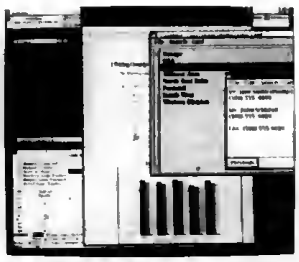
Whether you're a user or an applications developer, with DECwindows software there's one, easy-to-use interface that's the same across operating systems. You can display text, graphics and imaging all at the same time. And with our new DECwrite™ and DECdecision™ software, you can link your document's information with its source. Whenever it changes there, your document can be instantly revised.

DECwindows desktop software. It's your window for integrating all the computing resources of the organization. All right from your desk.

One easy-to-use interface lets you display applications across operating systems. You can display financial projections running on your MS-DOS computer.

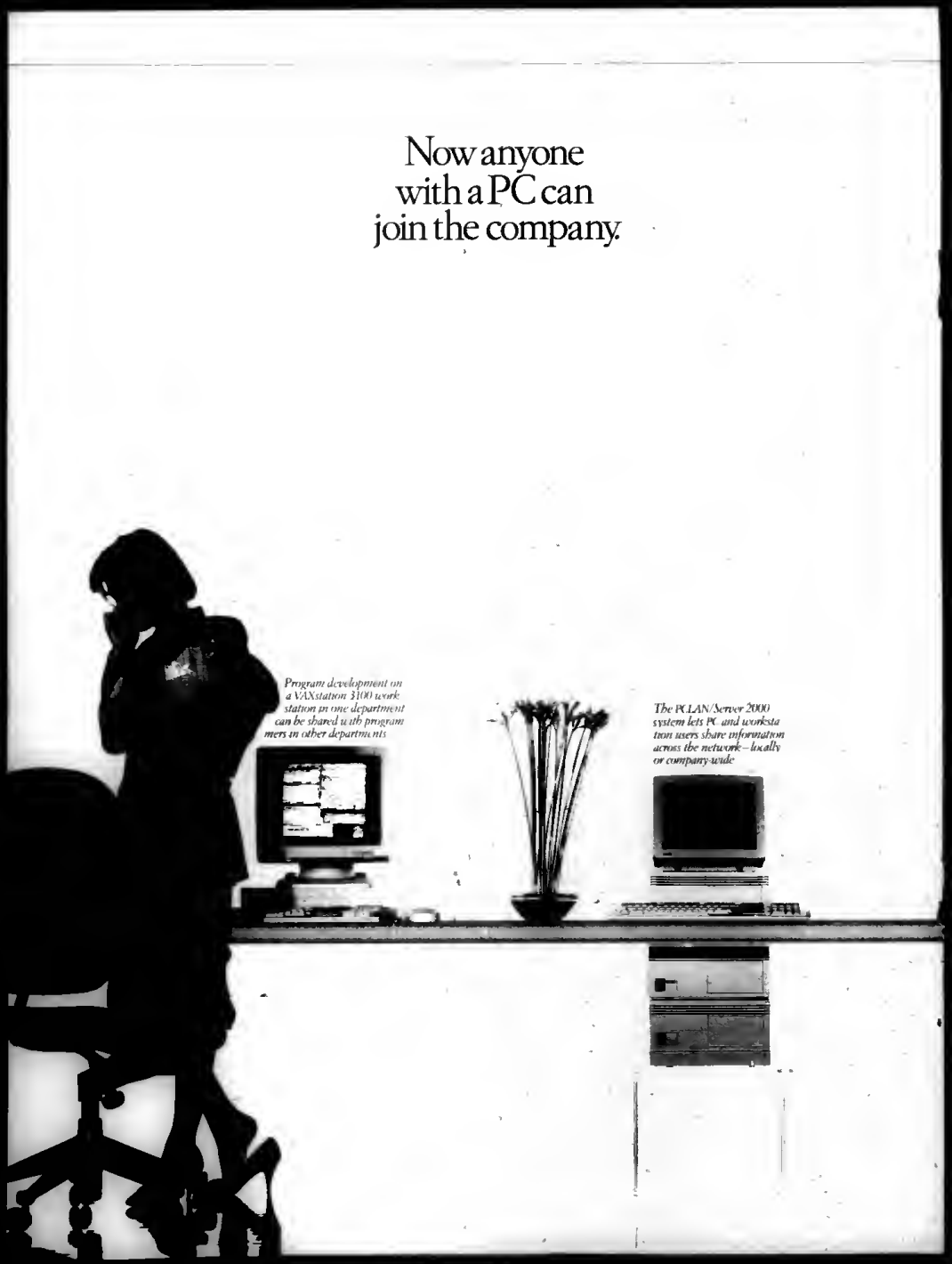


Using the same interface, you can display graphics running on a VMS computer to update your report.



Just as easily, you can display a file from a UNIX computer. It's all yours to manipulate the way you want.

Now anyone with a PC can join the company.



Program development on a VAXstation 3100 workstation in one department can be shared with programmers in other departments

The PCLAN/Server 2000 system lets PC and workstation users share information across the network—locally or company-wide

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If you just want to tie your PCs together in a local area network, any PC LAN vendor will do.

But, if you want to tie your PCs together and make them an integral part of your company's network, any PC LAN vendor won't do. Because it's not what they do. It is, however, something Digital does better than anyone else.

With our PCLAN/Server™ 2000 system, the latest implementation of Digital's Network Applications Support, you can easily tie together PCs from major manufacturers like Apple,® COMPAQ,® IBM, Olivetti and Zenith. Besides letting PC users share information with each other, the PCLAN/Server 2000 system lets them share information with any computer on the network – no matter what size it is, no matter where it's located. It's the kind of total integration that only Digital can deliver.

Because the PCLAN/Server 2000 system is powered by VAX technology, not PC technology, users can avoid the usual LAN bottlenecks that slow down their access to information. Because it's VAX technology, it also means you can grow in any direction you choose. And finally, Digital offers full service and support for any system on the network.

The PCLAN/Server 2000 system. All the resources of your company's network are now available on a local area network.

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Results from a manufacturing application on an IBM PS/2® on the factory floor can be incorporated in marketing at headquarters

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With the introduction of our new desktop computing systems and DECwindows software, we extend the vision even further. Now there's one company that provides total hardware integration to join your company at every level. One company that provides total software integration to make software a common resource shared by all. One company that provides total service and support to make sure it all works the way you want it to work.

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COMPANY	PRODUCT	SINGLE OR MULTIUSER	OPERATING SYSTEMS	MEMORY REQUIREMENTS (IN BYTES)	ADDRESSES MORE THAN 640K BYTES OF RAM	VERSION OF SQL	IS SQL INTERACTIVE OR EMBEDDED?	IMPORT/EXPORT FILE FORMATS SUPPORTED	RECORDS PER TABLE	FIELDS PER RECORD	CHARACTERS PER FIELD	FILES THAT CAN BE OPENED AT ONE TIME	DATA DICTIONARY/SYSTEM CATALOG	LANGUAGES SUPPORTED	WINDOWING FACILITIES SUPPORTED	NETWORKS SUPPORTED	PRICE
Goldstone Computer Services, Inc. (215) 535-1606	Goldstone	Multiuser	DOS	192K	No	None	NA	DIF	*	800	800	Unlimited	Yes	Basic	MP	Novell	$695
Hence Software, Inc. (617) 890-8670	PC-Info	Single	DOS	512K	No	None	NA	ASCII, SYLK, DIF, SPF	*	Unlimited	4,096	10	Yes	Proprietary	None	None	$1,200
IBM Contact local sales office	OS/2 Extended Edition 1.2	Multiuser	OS/2	3M	Yes	IBM SAA	Both	Delimited ASCII, nondelimited ASCII, WKS, WK1, WRK	Unlimited	255	32,700	NP	Yes	IBM Cobol/2, Fortran/2, Pascal/2, Procedures Language	Presentation Manager	Token-Ring, PC Network, Ethernet	$630
Informix Software, Inc. (415) 926-6300	Informix-4GL Rapid development system and interactive debugger	Both	Unix, DOS	640K	Yes	ANSI Level 1	Interactive	1-2-3, Dbase, ASCII	*	Unlimited	Unlimited	MP	Yes	Microsoft, C, Cobol	None	Netware, 3+, IBM PC LAN	Starts at $1,495 (runtime: $595)
	Informix 4GL	Both	Unix, DOS, OS/2, VMS	640K	Yes	ANSI Level 1	Interactive	1-2-3, Dbase, ASCII	*	Unlimited	Unlimited	MP	Yes	Microsoft, C, Cobol	None	TCP/IP, Sockets, Decnet, Netware, 3+, IBM PC LAN	Starts at $595 (runtime: $200)
	Informix-SQL	Both	Unix, DOS, OS/2, VMS	640K	Yes	ANSI Level 1	Interactive	1-2-3, Dbase, ASCII	*	Unlimited	Unlimited	MP	Yes	C, Cobol	None	TCP/IP, Sockets, Decnet, Netware	$795 (runtime: $250)
Interactive Support Systems, Inc. (212) 560-1279	Marcon Plus 3.51	Multiuser	DOS	640K	No	None	NA	ASCII	1,679,615	1,679,615	Unlimited	80	Yes	C	NP	Novell, Star, Banyan	$795
Interactive Technologies, Inc. (503) 644-6111	RDM	Multiuser	DOS, Xenix, VAX/VMS, RSX	512K	No	None	NA	RMS, ASCII	16 million	250	255	Unlimited	Yes	Pascal, C, Fortran	None	3Com, Novell, Banyan	$995-$1,495
Intersystems Corp. (617) 621-0600	M/SQL	Multiuser	SCO Xenix 386	4M	Yes	ANSI Level 1	Both	Unix sequential files	*	450	Unlimited	Unlimited	Yes	MUMPS	Proprietary	None	$695-$9,900
Jaybe Software (602) 237-2200	C Data Base Management Tool Kit	Multiuser	Unix, Xenix, AIX, A/UX	5M	No	None	NA	ASCII	*	Unlimited	Unlimited	Unix dependent	Yes	AWK, C	Unix	NFS	$495
MDBS, Inc. (800) 344-5832	Knowledgeman/2	Multiuser	DOS, OS/2	512K	Yes	Proprietary	Both	ASCII, DIF, Basic, WKS	More than 1 billion	255	65,535	16	Yes	Knowledgeman 4GL, C	Presentation Manager	Novell, IBM, 3Com	$695 (runtime: $25-$50)
	MDBS III	Multiuser	DOS, OS/2	512K	No	IBM SAA	Both	ASCII, DIF, Basic, WKS	More than 1 billion	255	65,535	50	Yes	C, Pascal, Basic, Fortran, Knowledgeman, Cobol	None	Novell, 3Com, IBM	$3,900
Metalife Information Systems, Inc. (507) 286-9223	Metaview	Multiuser	DOS, PC-MOS	384K	Yes	None	NA	ASCII	2 million	600	1,000	255	No	Metaview	Program control	Nabios	$2,200
Micro Business Applications, Inc. (612) 894-3470	Phd Relational Database	Both	DOS	128K	No	None	NA	ASCII	*	Unlimited	Unlimited	Memory dependent	No	Cobol, Assembler	None	Novell	$580
Microrim, Inc. (206) 885-8000	R:Base	Both	DOS, OS/2	512K, 640K LAN	No	ANSI Levels 1 and 2	Embedded	MP	*	Up to 800 columns per database	Up to 4,000	Up to 80	Yes	C, Fortran, Pascal	None	3Com Ethershare; IBM PC Network, Token-Ring; Novell	$738 for DOS, $885 for OS/2
Must Software International (203) 845-6000	PC Nomad	Single	DOS	640K	Yes	None	NA	Nomad, Dbase, DIF, 1-2-3	*	Unlimited	255	Unlimited	Yes	Nomad 4GL	Nomad Windows	None	$795 (runtime: $100)
Nantucket Corp. (213) 390-7833	Clipper	Multiuser	DOS	384K	Yes	None	NA	MP	1 billion	4,096	680	250	No	C, Assembler, Pascal	Yes	None	$695
	Mentor	Single	Macintosh	384K	NA	None	No	SDF, MPS	65	2,000	255	32	NA	Dbase	Yes	None	$695
Odesta Corp. (312) 498-5615	Double Helix II	Both	Macintosh	1M	Yes	None	NA	ASCII, DIF, SYLK	*	Unlimited	32,000	Unlimited	Yes	Proprietary	Apple	Appletalk	$595
O'Hanlon Computer Systems (206) 464-8300	ODBS	MP	DOS; Concurrent DOS, CP/M; Turbo DOS; Altos 886	256K	No	None	NA	DIF, SYLK, ASCII	*	9,999	800	16 plus 8 system files	Yes	ODBS	None	Novell, OS, Altos, Lantastic, Omninet	$695-$995 (runtime: $95-$995)
On-Line Software International, Inc. (800) 257-9523	Ramis/PC	Both	DOS, OS/2	640K	No	None	NA	DIF, WKS and WK1, DIF	4 billion	255	75	Unlimited	No	Ramis, System	None	Banyan, Novell, IBM PC LAN	$595
Oracle Corp. (415) 506-2000	Oracle Quickstart	Multiuser	DOS	640K	Yes	ANSI Level 2	Both	DIF, ASCII	*	255	32,767	Unlimited	Yes	Dbase, SQL	None	Novell, 3Com, IBM, Banyan	$695
	Professional Oracle	Single	DOS, OS/2	640K	Yes	ANSI Level 2	Both	ASCII	*	800	32,767	Unlimited	Yes	SQL, C	Presentation Manager	Novell, 3Com, IBM, Banyan	$1,200
Paperback Software International (415) 644-3116	VP-Info	Multiuser	DOS	384K	No	None	MP	ASCII	64,000	256	254	6	No	Proprietary	None	Novell, 3Com, IBM	$125
P-Stat, Inc. (609) 924-0149	P-Stat	Multiuser	DOS, Unix, Xenix	640K-4M	Yes	None	NA	ASCII, DIF	*	2,000	800	One P-Stat file and multiple TEXT files	No	Proprietary	None	None	$995-$1,995
	P-Stat	Multiuser	DOS, Unix, Xenix	16M-64M	Yes	None	NA	ASCII, DIF	*	2,000	800	One P-Stat file and multiple TEXT files	No	Proprietary	None	None	$995-$1,995

COMPANY	PRODUCT	SINGLE OR MULTIUSER	OPERATING SYSTEMS	MEMORY REQUIREMENTS (IN BYTES)	ADDRESSES MORE THAN 640K BYTES OF RAM	VERSION OF SQL	IS SQL INTERACTIVE OR EMBEDDED?	IMPORT/EXPORT FILE FORMATS SUPPORTED	RECORDS PER TABLE	FIELDS PER RECORD	CHARACTERS PER FIELDS	FILES THAT CAN BE OPENED AT ONE TIME	DATA DICTIONARY/SYSTEM CATALOG	LANGUAGES SUPPORTED	WINDOWING FACILITIES SUPPORTED	NETWORKS SUPPORTED	PRICE
Precision Software (914) 920-4800	Superbase	Both	DOS	640K	Yes	None	NA	Dbase II, III, III+; 1-2-3; Exact; ASCII; DIF; Logistix	*	Unlimited	256	Hardware dependent	Yes	Proprietary DML, DOS	MS Windows, GEM graphical interfaces	Netware, Netbios-compatible	$195-$695 (runtime: $95-$445)
Prime Computer, Inc. (508) 651-8000	Information/PC	Both	DOS	640K	Yes	None	NA	ASCII	*	Unlimited	64,000	Unlimited	Yes	Basic	None	Netware	$650-$1,500 (runtime: $200-$750)
Profitem Group, Inc. (714) 586-9033	Profitem	Both	DOS	512K	No	None	NA	ASCII	1,024	64	1,024	6	Yes	Assembler, C	Proprietary	Ethernet	$395
Program Software Corp. (617) 275-4800	Program	Multiuser	DOS, Unix, VAX/VMS, CTOS/ BTOS, Xenix, Ultrix	640K-MS-DOS, 2M-Unix	Yes	ANSI Level 1	Interactive	ASCII, DIF, DBF, SYLK, Dbase	*	32,000	32,000	Unlimited	Yes	C	None	Novell, Banyan, 3Com, Token-Ring, Netbios, TCP/IP, Decnet, Ethernet	$1,000-$154,000 (runtime: $200-$31,250)
Rachel Corp. (800) 788-1666	Rachel	Multiuser	Unix, VMS	1.5M	Yes	None	NA	ANSI, Dbase III, Clipper	*	128	256	10	Yes	Rachel, C, Fortran, Cobol, Basic, Dbase III, Clipper	DEC Windows	None	$1,500-$45,000
Relational Technology, Inc. (415) 769-1400	Ingres	Both	DOS, AIX, Unix	640K-DOS, 4M-Unix/ AIX	Yes	ANSI Level 1, proprietary	Both	Ingres, ASCII, DIF, Lotus, Dbase	*	127	2,000	Unlimited	Yes	SQL, C	NP	Decnet, TCP/IP	$695
Revelation Technologies, Inc. (212) 689-1660	Advanced Revelation	Both, presently multiuser	DOS, OS/2	512K-DOS; 640K-OS/2	Yes	ANSI Level 1	Both	Dbase, DBF, Lotus, WKS/WK1, ASCII	*	32K	64K	6,000	Yes	C, Assembler, Xbasic	Advanced Revelation Windows	Vines; Netware, Advanced Netware; 3+; Starlan; IBM PC LAN	$495-$1,195 (runtime: $300)
Rim Technology, Inc. (206) 383-4778	RTIRIM	Single	DOS	640K	No	None	NA	ASCII	*	Unlimited	4,000	1	Yes	Fortran, C, Pascal	None	None	$800
Sabora Systems, Inc. (813) 944-9482	Sabora-Base	Multiuser	DOS, OS/2, Xenix	640K	No	None	NA	All supported, only ASCII exported	16 million	255	256	15	Yes	Pascal	None	Netware, 3+ share, Vines	$1,495
Sharebase Corp. (408) 378-7000	Server/300	Multiuser	DOS, Unix, Xenix	NA	No	ANSI Level 1	Both	Lotus, Wordstar, Dbase, PFS	2 billion	256	256	256	Yes	C	None	3Com, Ungermann Bass XNS	$45,000-$136,000 (includes server hardware)
	Server/700	Multiuser	DOS, Unix, Xenix	NA	No	ANSI Level 1	Both	Lotus, Wordstar, Dbase, PFS	2 billion	250	256	256	Yes	C, Cobol, Fortran	None	3Com, Ungermann Bass XNS, Decnet, TCP/IP	$195,000-$280,000 (includes server hardware)
	Server/8000	Multiuser	DOS, Unix, Xenix	NA	No	ANSI Level 1	Both	Lotus, Wordstar, Dbase, PFS	2 billion	32,000	255	7,856	Yes	C, Fortran, Cobol	None	3Com, Ungermann Bass XNS, Decnet, TCP/IP	$345,000-$495,000 (includes server hardware)
Software Products International (619) 450-1536	Open Access II	Both	DOS	256K	Yes	Proprietary	Interactive	Dbase II, III; WKS; DIF; ASCII	2 billion	100	78 text	Unlimited	No	None	None	Netware, 3+, Vines, any Netbios-compatible	$295-$695
SSR Corp. (716) 264-3200	Omnilite	Single	DOS	392K	No	None	NA	ASCII, DIF	*	64	1828	1	Yes	None	None	None	$425
Starware Computer Corp. (203) 488-6464	Plan and Peform	Single	DOS	256K	Yes	None	NA	DIF, delimited, ASCII, Dbase	65,000	128	78	3	No	C	None	None	$295
Stone Edge Technologies (215) 641-1825	DB Master Professors	Single	Pro-DOS	128K	No	None	NA	ASCII, Appleworks, DIF	*	200	250	10	No	None	None	None	$295
Sybase, Inc. (415) 596-3500	Sybase SQL Server	Multiuser	OS/2	4M	Yes	ANSI Level 1	Both	ASCII	*	255	256	16	Yes	C, Ada, Cobol, Fortran, Pascal	MS Windows/Presentation Manager, DEC Windows	LAN Manager	$2,495
Teradata Corp. (213) 827-3777	DBC/1012	Multiuser	MVS, VM, TPF, VMS, Unix, DOS	640K	No	ANSI Level 2, DB2	Both	Spreadsheets, word processors and other databases	*	256	32,000	Unlimited	Yes	C, Cobol, PL/1, Fortran, Assembler	PC/SQL-LINK	Ethernet	$795-$1,990
The Santa Cruz Operation, Inc. (408) 425-7222	SCO Foxbase+	Multiuser	Xenix, Unix	1.5M	Yes	None	NA	ASCII, Dbase III Plus, DOS, Foxbase	1 billion	128	256	10	No	Dbase III Plus	SCO Multiview	SCO Xenix-Net, Async Net	$795-$995 (runtime: $295)
	SCO Integra	Multiuser	Xenix, Unix	1.5M	Yes	ANSI Level 1	Interactive	Dbase, SCO, Foxbase, 1-2-3	*	256	2,048	NP	Yes	Pascal, Fortran, Cobol, Basic	SCO Multiview	SCO Xenix Net, Async Net	$995-$1,295
The Small Computer Co. (914) 769-3160	Pinpro Plus 3.0	Multiuser	Unix, Xenix, DOS	512K	No	None	NA	ASCII, SYLK, DIF	*	999	999	20	Yes	Proprietary	None	PC Net, Novell, 3Com, Netbios-compatible	$300 DOS; $300 network
Stelly Corp. (914) 359-6060	Accell	Multiuser	Unix, Xenix	4M	Yes	ANSI Level 1	Embedded	ASCII, Text	2.3 billion	2.3 billion	2.3 billion	NP	Yes	C	MS, Accell Windows	Any with TCP/IP gateway	$4,500-$130,000
Unlimited Processing Corp. (904) 731-5330	Team-Up 2.3	Multiuser	DOS, Concurrent DOS	155K	No	None	NA	ASCII, DIF	*	1,000	1,900	3	Yes	Pascal, Assembler, C	Team-Up Windows	All networks running DOS 3.1, Netbios	NP
Via Information Systems Corp. (408) 249-9630	Viaflex	Multiuser	DOS, OS/2 Extended Edition	512K	No	ANSI Level 1, IBM SAA	Both	ASCII with various delimiter options	*	Unlimited	Unlimited	NA	Yes	C	Text-based screen painter	Netbios, X.25, LU6.2	$1,395-$3,500
Watcom Products, Inc. (519) 886-3700	Perfekt	Single	DOS	512K	Yes	ANSI Level 2	Both	Fixed, ASCII, Wordfix	6 million	16,384	16,384	Unlimited	Yes	C	Proprietary	Any DOS-compatible	$700 (runtime: $300)
Wattleview Corp. (201) 383-0600	Transformer	Multiuser	DOS	160K	No	None	NA	ASCII	16 million	80	510 million	Unlimited	No	None	MS Windows	Netware	$695
Wordtech Systems, Inc. (415) 254-0900	DBXL/LAN	Multiuser	DOS	512K	Yes	None	NA	DIF, IMP, SDF, SYLK, WKS, PCX	1 billion	512	254	10	No	Dbase, C	Dosqview, internal	Novell, PC LAN, Banyan, PC Net, Lantt, Netbios	$599
	Quickdriver	Multiuser	DOS	512K	Yes	None	NA	DIF, SDF, SYLK, WKS, PCX	1 billion	512	254	10	No	Dbase, C	Dosqview, internal	Novell, PC-LAN, PC-Net, Banyan, Netbios, Lantt	$599
	DBXL	Single	DOS	512K	Yes	None	NA	DIF, SDF, IMG, PCX, WKS, SYLK	1 billion	512	254	10	No	Dbase, C	Dosqview, internal	Novell, PC LAN, Banyan, PC Net, Netbios	$249
Zenith Information, Inc. (312) 720-1387	ZIM	Both	VM/CMS, VAX/VMS, Unix, Xenix, DOS, OS/2	640K	Yes	ANSI Levels 1 and 2, IBM SAA	Both	Delimited columnar	*	16,383	32,767	OS dependent	Yes	Proprietary 4GL, C	MS Windows, Presentation manager, proprietary	Netware, OSI, Netbios	$800 (runtime: $150)

Managing the Macintosh

How to orchestrate users' networking, peripherals and applications needs

BY ASHLEY GRAYSON

Managing micro environments based on Apple Computer, Inc.'s Macintosh is a growing specialty within the information systems community. Superficially similar to managing IBM and compatible personal computers as well as other computer systems, the job also carries an aura of uncertainty. Are Mac users fundamentally the same as PC users? Or does using a Macintosh, like taking Dr. Jekyll's tonic, transform the mild-mannered office worker into a counterculture Mac activist?

Actually, managing the Mac environment requires only a slightly different perspective on the manager's part and a strong ability to deal with the unique Mac elements. Among the issues governing the Mac community are its rather diverse body of users and the rapidity of change. It is not surprising that the questions of where you are now and where you want to go with your Macintosh environment need to be asked before planning how to get there.

The manager with the task of introducing Macintoshes into an organization should first identify the roles the Macs are to fulfill. Originally, computers were placed in an organization for an individual to use to complete a certain task. Today, the objective of becoming computerized has shifted in many companies from the well-defined delivery of specific applications to vague goals of enhancing personal productivity without a clear idea of how that will be measured.

Despite the difficulty in quantifying productivity, experienced managers report that Macs do not fundamentally change people, although they often amplify both individual traits and group dynamics. Thus, the newly appointed Mac manager might be faced with any one of a range of management expectations:

- Make the organization work better by bringing in Macs, which might be perceived by some users — and even upper management — as somehow superior to PCs.
- Communicate throughout the company one department's successes achieved with Macs.
- Build a particular Mac-based capability within the company such as presentations and publishing.
- Merge Macs into an existing PC or mini/mainframe structure.
- Get a grip on the uncontrolled growth of Macs being acquired within various departments organizationwide.

Fortunately, most of the technical issues that must be faced in acquiring Macs and peripherals and making decisions about networks are independent of whatever situation the manager faces and can be handled with the same set of managerial and organizational skills. The users' needs will merely establish the order in which the questions of systems, storage devices, networks and so on are addressed.

Universal issues that the Mac manager will have to consider include the following:

- Which Macs to buy and who gets what kind of machine.
- Which add-ons and peripherals to buy.
- How to best benefit from the built-in network that is part of every Macintosh.
- What applications to standardize on and how much nonstandard software should be encouraged or tolerated.

An intriguing quality of today's Mac market is the rapidity with which decision criteria will shift. An entire analysis can be invalidated by a single product announcement.

MICK WIGGINS

Pick a Mac, any Mac

Despite the profusion of new models, the decision about which Macintosh to acquire hinges on a few key points:

- Except for applications requiring color monitors, anything the Mac can do, it can do quite well on the original one-bit black-and-white monitor.
- All of the new Macs — the Mac SE/30, Mac IICX and Mac IIX — run at the same speed. It is no longer necessary to provide a Mac II just because the user needs a faster machine.
- The single expansion slot on the SE/30 is not used on any other Mac and is not compatible with the older SE's slot. Apple's proprietary standard Nubus slots on the Mac II family are all mutually compatible.
- Only the SE/30, Mac IICX and Mac IIX include the Motorola, Inc. 68030 processor, which

Grayson is the founder of ADG, a San Pedro, Calif.-based organization that develops sales tools and programs for high-technology companies. ADG operates its own network of Macintoshes and PCs that contains one of almost everything.

• Diverse users, changing market critical

• Do Macs really change people?

• It's not so different from managing PCs

will be needed in order to benefit from the features in System 7.0, the Mac operating system upgrade due January 1990. Older products — the Mac Plus, Mac SE and Mac II — lack the necessary memory management hardware. System 7.0 will require at least 2M bytes of memory.

The Mac manager's dilemma of acquiring Macs without the 68030 chip or going with the new line is analogous to that faced by his PC counterpart in entering the Intel Corp. 80286 vs. 80386 face-off. The fact is that the 286-based PC and the Motorola 68000- and 68020-based Macs will be left behind by future software requiring the newer systems. (There is the possibility of making a board switch, but that is nearly as expensive as buying a new machine.) The question for the Mac manager and the corporation is, will the short-term cost benefits outweigh the longer term expansion limitations?

THE QUESTION for the Mac manager and the corporation is, will the short-term cost benefits of not going with the 68030 chip outweigh the longer term expansion limitations?

Another aspect of hardware choice is accelerators — expansion cards that can significantly speed up a Mac Plus or SE. While they are a good way to speed up existing systems, they may cost as much as a new SE/30. Further, such accelerators currently lack the 68030 chip, and managers should carefully consider whether or not to adopt them until they offer a memory management solution.

The next decision facing the Mac manager is from whom to buy. PCs may have paved the way for the mixed-vendor shop, but as the only non-IBM PC or compatible PC acceptable to business, the Macintosh relies heavily on third-party hardware and software to deliver value. Often, pure Apple configurations lag behind mixed-vendor configurations in both capability and price/performance measures. In any case, a less expensive alternative may be the better solution.

Functionality, too, often comes late from Apple. For example, Macintoshes have long been promoted for their ability to do high-level page layout and design. However, until January of this year, when Apple introduced single- and double-page black-and-white monitors, the largest monitor Apple made was the 14-in. color monitor for the Mac II. Buyers who wanted larger screens had to look to such vendors as Supermac Technology Co. in Mountain View, Calif., and Sigma Designs, Inc. in Fremont, Calif., for high-resolution monitors and video cards.

Byting down

Also in January, Apple offered its first hard disk larger than 80M bytes — a 160M-byte hard disk. Previously, disks holding more memory than 80M bytes had to come from Rodime, Inc. in Boca Raton, Fla., Jasmine Technologies, Inc. in San Francisco, CMS Enhancements, Inc. in Tustin, Calif., Supermac or any of a dozen other vendors.

Today, third-party vendors are the only source for 300M- and 600M-byte disks. Large disks for working and archiving are an absolute necessity for any department doing desktop publishing or desktop presentations; stored images and page layout files can take up 500K bytes to 1M byte each, sometimes even more. Many users will likely need such large disks.

While important to the marketplace, Apple's broadening of its product line is not without a few trade-offs. The company has a tendency to develop products — such as electronic mail, word processing and database — positioned in the most profitable part of the markets opened by its add-on developers rather than focusing on the products that only it can develop well such as hardware and system software. Although Apple now offers more solutions than ever, the frontier keeps expanding, and the third-party price advantage is continually appealing.

Therefore, the Mac manager must expect to seek out performance products from a variety of vendors and through sales channels that include mail order, retailers and systems integrators.

Many of the third-party vendors exist only within the Mac community and range from the established Jasmine, the largest of the mail-order houses, to such start-ups as Micronet Technology, Inc., a small Irvine, Calif., company with a wide hard-disk line. Experienced computer managers may recognize and feel more comfortable with long-time Digital Equipment Corp. VAX add-on vendors such as Clearpoint, Inc. in Hopkinton, Mass., which now offers Macintosh memory cards, and CMS Enhancements, which offers a variety of Macintosh-compatible disks.

Tying it all together

Networking is an almost-free extra on Macintoshes because of the Appletalk controller embedded in every Mac. Cables to route the network are available from Apple, Sun Microsystems, Inc.'s Tops Co. division in Alameda, Calif., and Farallon Computing, Inc. in Berkeley, Calif., among others. This simple

Look where our information systems are today.

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network will allow s work group to share an Apple Laserwriter. Adding E-mail requires a system such as Microsoft Corp.'s Mail or Tops' Inbox. To implement file sharing requires making some careful choices among programs such as Apple's Appleshare or Tops' network product and then assessing the need for more exotic networking such as Ethernet. Apple is rumored to be considering supporting Token-Ring-based networks but only for Mac II family models.

The choice of a network can significantly affect an organization's work flow. File transfer allows people to exchange information when needed. Networks carry the information's entire file structure, not just individual files, to the whole user community. The manager deciding on networking architecture will need to have an understanding of how Mac users actually work, but the criteria for decision making are easy to enumerate:

- Basic Appletalk allows s work group to share s Laserwriter and add E-mail at low cost.
- Although Appleshare dedicates an entire Mac to the job of file server and requires operations management, it has several advantages: Uniform, organized backup is possible when all files are on the same server; a system of user/group/world file access privileges similar to those found under Unix and VAX/VMS are enforced; and s single print queue is maintainable on the server.
- Tops may be a better networking choice if the sharing requirements change dynamically and need to be under the users' control. Because Tops allows users to manage their own machine's presence on the network, it will always do what the users want without s lot of the Mac manager's attention. Whether Tops is more uncontrollable or more adaptable depends strictly on one's point of view, but there are two solid advantages to Tops. First, it can be introduced one computer at s time because it is only s software module. Second, Tops also works with PCs if s Tops Flashcard is installed in the computer. Low-cost modules allow PCs to print on the network's Postscript printer and exchange files with the Macs.

Mac standardization

It would be ironic if the machines that offer users s unique environment for creativity became so strangled in standards that they blocked the self-expression possible with the Mac. Nevertheless, some standards must be maintained, or the very attributes that make the Mac an appropriate choice as s medium for cooperative work will spread confusion at electronic speeds.

Thus, the Mac manager should view himself as an orchestra conductor, allowing each player complete discretion in how he plays while keeping everyone on key and in time with one another.

- **Which word processor, spreadsheet and mail system should be on every system?** In today's Mac environment, there are several choices for virtually every application. Such programs need to be selected not only on the basis of their features but on how well they integrate with other packages. The choices between Microsoft's Word and Ashton-Tate Corp.'s Full Write or Microsoft's Excel and Informix Corp.'s Wingz and Adobe Systems, Inc.'s Pagemaker or Quark Xpress are not always clear. Word 4.0 can even compete with Pagemaker for most office layout applications. Further, Wingz may represent an appropriate alternative development tool to Hypercard for numerically intensive user-developed applications.
- **What standard programs should always be available under the Apple menu (the source of the ever-present desk accessories)?** Apple has indicated that desk accessories will function differently under System 7.0 and will disappear in System 8.0.
- **How will backup be handled?** Even with a central file server, users can isolate or hide — and thus possibly lose — potentially valuable data by storing only to their machines and not to the file server as well.
- **Once established, how should standards be enforced?** One underestimated mechanism for spreading organizational standards is the use of style templates in Microsoft Word. Word on both the PC and the Mac can separate in s template the information that formats, or controls, the appearance of s document from the text and images in the document. Style templates can be shared, and a document can be easily viewed in different styles. Every dollar invested in developing good templates can return threefold in reduced user training, smoother operation and the greater comprehension possible with uniform document appearance.

> SOME standards must be maintained, or the very attributes that make the Mac an appropriate choice as a medium for cooperative work will spread confusion at electronic speeds.

The Macintosh environment is good for studying what happens when standards, set up to be followed, may not actually be what people use in practice. Indeed, even when focusing on the hardware and software of the Macintosh, the way people choose to work overrides many technical issues such as networking, and the unique qualities of the Mac changes what people can work with.

This year and next comprise a period of major announcements, not just of point products but of direction-shifting standards. Both Apple and third-party vendors want customers to buy now but do not always correctly identify what trends will drive future products. Often, they do not know. The buyer's challenge is to build s decision-making process that will select solid alternatives at each point. •

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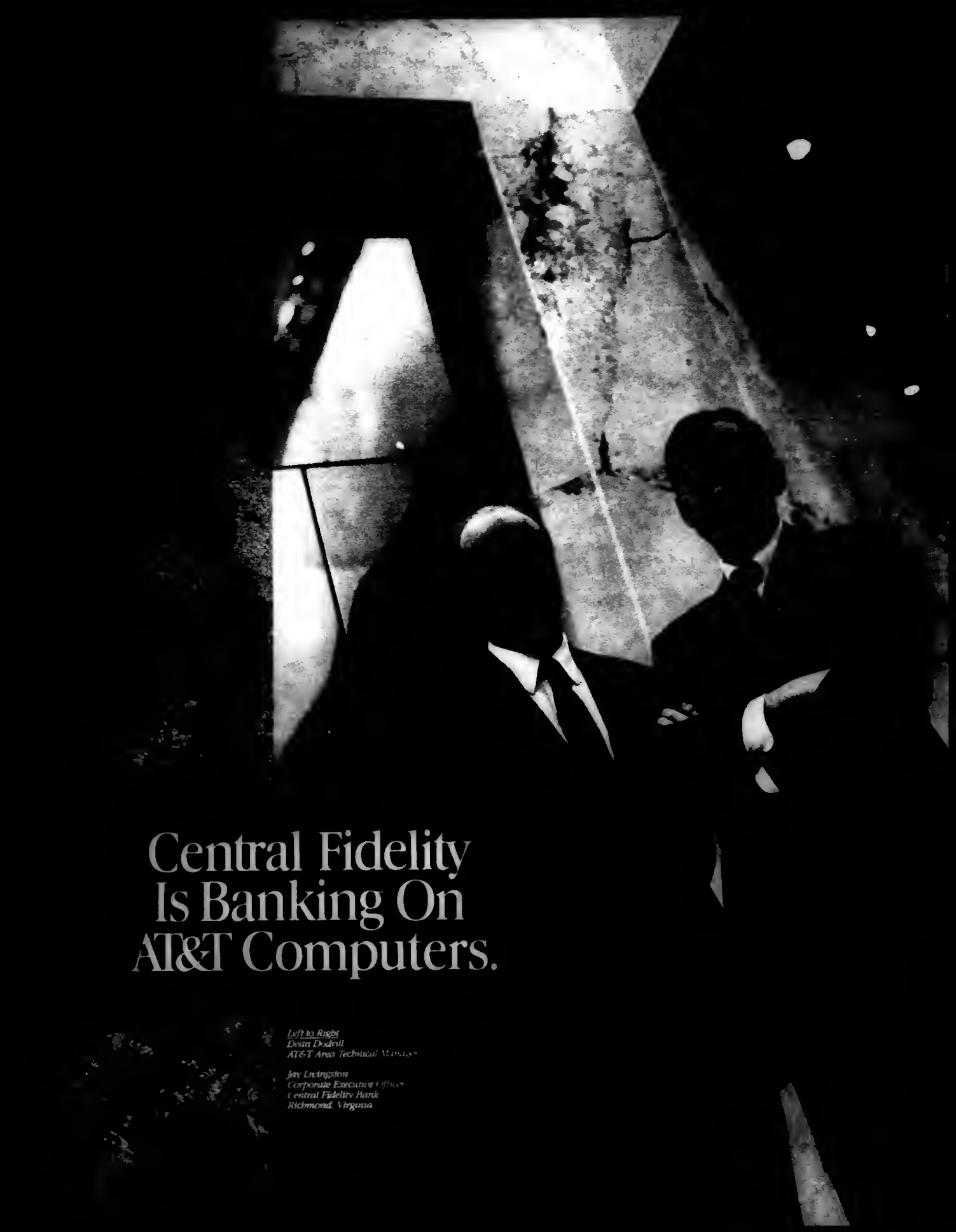

Central Fidelity Is Banking On AT&T Computers.

Left to Right
Dean Dodrill
AT&T Area Technical Manager

Jay Errington
Corporate Executive Officer
Central Fidelity Bank
Richmond, Virginia

Richmond, Virginia
February 2, 1989

Central Fidelity Bank is among the nation's top 100 commercial banks with $4.8 billion in assets. Looking to extend its fourteen-year record earnings streak, the bank commissioned its data processing division to deliver a vital strategic initiative, improve productivity, enhance sales opportunities, and provide faster customer service in the bank's nearly two hundred branch offices. Jay Livingston met recently with Dean Dodrill of AT&T to review their work together.

Jay: Service is what bank customers expect. Faster service improves customer satisfaction and leads to more profitable relationships. When you speed up service, everyone is more productive, and we can spend more time with customers selling the bank's financial products.

Dean: Service and selling both depend on information. Our challenge was to provide the branches with rapid access to customer information and present that information to branch personnel in the most meaningful way. This could only be accomplished with a distributed, networked computing approach.

Jay: That's right. Our first priority was service and sales support in our branches, which meant fast, accurate retrieval and dispersal of information was crucial. AT&T's banking architecture provided that.

Dean: Early on, you talked about cost-effectiveness, return on investment, and a strategy for future growth and functionality. Remember that?

Jay: With an emphasis on profitability. We had major investments in existing systems and a lot of branches. AT&T's open systems approach didn't require trade-offs or expensive host additions, which is one of the reasons you got the business. AT&T's creative alternatives surprised us.

Dean: The ease of networking AT&T WGS computers was fundamental to our proposal. We delivered maximum functionality, flexibility, and reliability to every workstation in each branch.

Jay: And StarLAN was a terrific way to connect and share branch resources. You made the most of our assets, including the intangible ones.

Dean: Like your customer databases—we found ways to further develop relationships with existing customers. The applications development tools we built saved time for your developers. New products and services can now be added quickly to both platform and teller software, so service and sales can continually improve.

Jay: Every bank employee associated with this system has become more productive. In my twenty-three years of banking, I've never seen a vendor provide such high-quality service and support. Central Fidelity Bank and AT&T are well positioned for the future.

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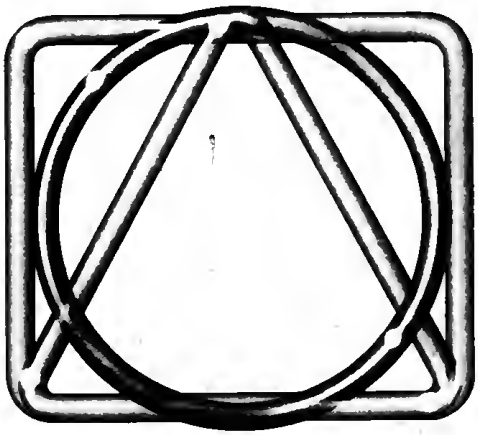

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Nell Margolis

Snipping the purse strings

Venture capitalists have lately observed something profoundly unsettling about the garages that dot the nation's technology enclaves from Route 128 to Silicon Valley: There seem to be cars in every one of them.

Where are today's seedling entrepreneurs?

They're not out in the garage where they ought to be, one dismayed venture capitalist told me. "We've got plenty of money, and we're interested in funding genuine start-up-level deals — but we're having a hard time finding good ones to fund," he lamented.

Just last month, the state of California conferred historical landmark status on the garage in which Messrs. Hewlett and Packard kick-started a company and the Silicon Valley legend. Maybe "historical" is the operative word. "There's certainly no shortage of brilliant people and great ideas," the venture capitalist said. "Places like Digital and Hewlett-Packard are chock-full of them. Why aren't we seeing people coming out of DEC and HP to start their own companies?"

Continued on page 84

Sale reels in $450M for CDC

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — The pruning of Control Data Corp. continued last week as the onetime computer industry giant sold its most profitable unit, disk-drive maker Imprimis Technology, Inc., to Seagate Technology, Inc. for $450 million in cash and securities.

The sale is the latest in a series of divestitures by CDC, which in April announced a $490 million restructuring charge and the folding of its money-losing supercomputer subsidiary.

The Imprimis deal, announced June 12 and still subject to regulatory approval, calls for Scotts Valley, Calif.-based Seagate to pay $250 million in cash and transfer $10.7 million worth of stock to CDC.

In addition, CDC will receive a $50 million promissory note from the drive maker. Under the agreement, Seagate will also supply data storage devices for CDC's Cyber line and Government Systems Division.

Pricey market

In announcing the Imprimis sale, CDC Chairman and Chief Executive Officer Robert M. Price said the OEM market for disk drives was deemed too expensive. The OEM market, Price said in a prepared statement, requires "considerable investment in new technologies to remain competitive."

CDC and Seagate, which have been talking for the past 1½ years, hope to complete the deal in August or September, according to a CDC spokesman.

Price said CDC will now focus on the services and systems integration side of its business while enjoying growth in the disk-drive business through its Seagate shares. After the stock transfer, CDC will hold about 18% of Seagate common stock.

Imprimis, formerly the Data Storage Products division, was incorporated late last year by CDC. The unit posted revenue of $1.15 billion in 1988, accounting for nearly one-third of CDC's $3.6 billion in sales.

Some analysts, expressing surprise that CDC would sell its most profitable division, see the action as part of a larger move away from the commercial market.

"We see CDC slowly walking away from the commercial market and concentrating on the government and scientific [computing] business," said Curt Beaumont, director of system and peripheral technology at International Data Corp. in Framingham, Mass.

Continued on page 86

Spring cleaning

What is gone:

- March: Twenty-two Control Data Institutes in West Germany and France sold.
- April: Approximately 3,100 jobs cut; ETA Systems, Inc. supercomputer subsidiary folded; Cyber mainframe business streamlined.
- May: Action Data Services sold; Control Data Institutes and Institute for Advanced Technology sold.
- June: Imprimis Technology, Inc. sold.

What remains:

- Cyber mainframe and workstation sales and support; Energy Management; and Government Systems.
- Data processing services.
- Audience research firm The Arbitron Co.
- Microgenesis automated trading room information systems.
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- Credit Union Services.
- Quorum System automated services for the legal market.
- Business Information Services.
- EFT Data Services.

At Joiner Associates, the medium is the message

BY HELEN PIKE
CW STAFF

MADISON, Wis. — Joiner Associates, Inc. brings a new twist to the never-ending debate over form and function.

The company functions as a privately held business, as a consultancy based on the statistical quality principles of W. Edwards Deming and as a network job entry (NJE) provider for IBM-Digital Equipment Corp. connectivity. Its form is based on the family's surname of Joiner. It is an ironic synonym for the point at which its flagship networking product and its consultancy coincide.

"Our clients are interested in transforming the way they are managing their companies," said Laurel Joiner, executive vice-president, about the company she founded with her husband, Brian, in 1983. "Software helps that to take place. It enhances productivity."

As consultants, the Joiners have attracted a select cadre of long-term clients from the electronics, heavy manufacturing, service and process industries that are interested in continuous improvement in their companies. The Joiners' approach closely parallels the work of Deming, the onetime AT&T engineer who taught the Japanese about low-cost, high-quality, high-volume manufacturing. Now age 85, Deming is back at work consulting in the U.S.

"One of the underlying princi-

Continued on page 84

Better days at Information Science

BY ROBERT MORAN
CW STAFF

MONTVALE, N.J. — When Bruce Coleman, chief executive officer and president of Information Science, Inc., joined the human resources management software company in November 1988, it was foundering in a sea of unprofitability.

Today, Information Science shows $104,800 in profits for its third quarter ended Jan. 31, based on quarterly revenue of $3.5 million — a far cry from the $564,300 net loss on $2.8 million revenue that the company posted for the comparable period last year.

Further, Coleman speculates that fourth-quarter and year-end figures, when they emerge later this month, will be written in black as well.

Information Science's current goal, according to Coleman, is to gain market presence with its human resources software tools. Its products include Classic, a modular system for non-database management systems environments, Database for Adabas and IMS environments and its premier product, Saavi, which provides integrated applications with SQL/DB2 relational retrieval and natural-language support tools.

Choppy waters

The person charged with spearheading the anticipated turnaround is conditioned to steering organizations through choppy waters. Coleman is the former chief executive officer and president of IBM-based software maker Boole and Babbage, Inc. He led that organization to 26% annual sales increases and pushed it beyond its 1985 losses of approximately $6 million to after-tax profits of $3.1 million in 1988.

There are several similar scenarios on his resume, each with at least one commonality: Coleman's penchant for taking chances.

Indeed, Information Science has crossed the line into profitability and is generating sorely needed cash. "The object of any turnaround is to fix the eternal problem: When you're losing money, you tend to have no cash," Coleman said.

With less backpedaling, infusions of equity from loans and independent investment and a continuing revenue stream, Coleman led the company in the early fourth-quarter acquisition of Implementation Support Associates, Inc. (ISA), a human resources consultancy and provider of customized software in Orangeburg, N.Y.

An acquisition so soon may raise a few eyebrows, but Coleman said that ISA was a nat-

Continued on page 83

Out of the woods?

Information Science has had four thorny years, but with a new leader and tightened focus, it could be on the comeback trail

SOURCE: INFORMATION SCIENCE, INC. CW CHART: FRANK C. O'CONNELL

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NICKELS & DIMES

Cermetek Microelectronics, Inc. reported a loss of $131,000 for the third quarter ended March 31, compared with net income of $19,000 for the third quarter last year. Revenue for the quarter was $802,000, compared with $1.8 million reported last year.

Emulex Corp. reported revenue for the third quarter ended April 2 of $37.9 million, compared with $31.8 million last year. Profits were $3.7 million, compared with $2.4 million a year ago.

Cipher Data Products, Inc. announced revenue for the third quarter that ended March 31 of $51.2 million, compared with $44.7 million reported a year earlier. Profits were $9.9 million, compared with $5.4 million the previous year.

LSI Logic Corp. reported revenue for the first quarter ended April 2 of $134 million, compared with $73.1 million last year. Profits were $8 million, compared with $4.7 million the previous year.

Pyramid Technology Corp. announced revenue for the second quarter ended March 31 of $24.6 million, compared with $18.9 million the previous year. Profits were $2.1 million, compared with $2 million reported for the comparable period a year ago.

Maxtor Corp. reported revenue for the fourth quarter ended March 26 of $97.7 million, compared with $85.7 million a year ago. Profits were $1.4 million, compared with $6.1 million for the like quarter a year ago.

Iomega Corp. announced the results for its first quarter ended April 2. The company reported revenue of $24.8 million and net income of $1.6 million. For the corresponding quarter of 1988, revenue was $30.1 million and net income was $3 million.

Cognos, Inc. announced revenue for the year ended Feb. 28 of $107.9 million, an increase of 30% over the previous year's revenue of $83 million. Net income more than doubled to reach $6.3 million, compared with $3.1 million for the previous year. Results for the fourth quarter show revenue of $36.1 million, an increase of 34% over last year's fourth-quarter revenue of $27 million. Net income was $3.3 million, up by approximately 50% from the $2.2 million reported in the like quarter last year.

On-Line Software International, Inc. announced income before extraordinary gain of $634,000 for the third quarter ended Feb. 28, compared with $1.9 million for the like quarter a year ago. During the current quarter, the company also realized an extraordinary gain of $675,000 from the reacquisition of convertible debt. Revenue for the quarter was $21.1 million, compared with $23.4 million a year ago.

Computer Horizons Corp. reported revenue for the first quarter ended March 31 of $19.7 million, compared with $19 million for the previous year. Profits were $401,000, compared with $675,000 in the comparable period a year ago.

Info Science

CONTINUED FROM PAGE 81

ural fit with Information Science. ISA, already an authorized Information Science agent prior to the acquisition, brings strength in project and practitioner skills that will balance what has been missing at Information Science, Coleman stated.

In the pink

Although the acquisition is on the books for the fourth quarter, Coleman appeared confident that the company will show fourth-quarter profits.

Further, he is betting that the two organizations will be able to provide systems integration support and service for human resources and management systems.

"The time for a surge forward is when you are profitable," Coleman said.

Coleman considers the company to be in phase two of its turnaround, which started in late 1987 when an investor group led by Vanguard Atlantic Ltd., a merchant bank in which Information Science Chairman Ernest E. Keet is a principal, injected $5 million into the troubled company.

Information Science's Coleman

In November 1988, Keet brought Coleman on board as president to continue the turnaround effort. Coleman was elected CEO this past April; Keet will remain as chairman.

With the first phase completed, Coleman will continue to attend to products and services and concentrate on selling to approximately 500 active clients as well as new prospects, he said.

"Coleman has demonstrated a talent for giving companies focus and turning them around," said J. Neil Weintraut, an analyst at Hambrecht & Quist, Inc. "In Sci [Information Science] is going to present him with a significant challenge — but it has a chance to become the leading independent provider of human resources software."

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Joiner

CONTINUED FROM PAGE 81

ples to improving quality is understanding variation and data, and how you analyze that data," Laurel Joiner said. "Software will help you get that done."

Besides serving their long-term clients, the Joiners and their staff conduct public seminars, publish journals and have recently come out with "The Team Handbook," a manual that shows how to pursue improvement projects in teams using Deming's statistical quality method.

Brian Joiner *employs statistical quality method*

As a software development company, Joiner Associates deals with management issues of a different kind — systems management between DEC VAXs and IBM mainframes.

The flagship product is called Jnet. It provides transparent file, batch, print, electronic-mail and real-time message transfers at the NJE level between DEC and IBM machines.

"NJE and Jnet were a happy coincidence," Laurel Joiner said. Referring to Stephen Arnold, who co-wrote Jnet, she noted, "Steve was aware of how important an interactive product would be to helping people do their jobs more efficiently."

Arnold, the company's research and development vice-president, co-wrote Jnet as a VM-to-VMS file transfer product.

To some extent, it was an extension of work he had done with the Joiners several years before on Minitab, a statistical software package. Minitab was co-written with Brian Joiner for the VAX/VMS environment in 1979 while Brian was teaching at Pennsylvania State University in State College, Pa.

The program, Laurel Joiner said, was designed to make statistics understandable to students, not merely to crunch numbers. "It was about concepts instead of calculations," she said. The Joiners subsequently sold their one-third interest in Minitab to start their new company.

Currently, they have 46 employees, evenly divided between the consulting and the software development groups. Each group accounts for about half the company's annual revenue, which should be about $6 million this year, according to David Miller, a business aide to the mayor of Madison prior to becoming Joiner's president.

Laurel Joiner *strives for interactive products*

"We're trying to help people move from the hierarchical, three-tier level of MIS to a client-server architecture," Miller said regarding the software organization's long-term goal.

"We want to help customers bring all those local-area networks into those corporate backbones," he added.

On the Unix front, the company hopes to drive job entry across Transmission Control Protocol/Internet Protocol, while later this summer it expects to release a new product for DEC-to-Application System/400 connectivity called the BSC/400 link driver.

Standard technique

"It's the thrust of the industry, especially between IBM and DEC, to get to some level of standards activity," said Myron Kirstetter, who advises midrange clients for Gartner Group, Inc., a market-research concern in Stamford, Conn.

"Some companies do it by speed. Some by interfaces. Joiner does it by expanding the NJE technique," Kirstetter continued.

From a price-setting point of view, Jnet is inexpensive compared with Fastpath from Intel Corp. or Interlink Computer Sciences, Inc.'s Channel connection, he said.

"Jnet is riding in a low-cost, reasonably functional level," Kirstetter added.

By May there were more than 1,200 Jnet systems in 31 countries. According to Miller, between 30% and 40% of higher education's Bitnet nodes in the U.S., Europe and Canada have Jnet.

The lowest price for installing Jnet on a Vaxstation is $1,700, with the typical software purchase intended for a Microvax connection to an IBM 370 for $8,000.

Freed up

According to George Reid, IS director for Sanford C. Bernstein & Co., Inc., a money management organization in New York, "The real beneficiary is the systems manager who doesn't have to tear his hair out. [Jnet] frees up the systems manager to take care of installing new systems [and] new software releases."

Reid, who installed Jnet software a week before Memorial Day, said the decision had been made last winter to move toward an IBM Systems Network Architecture gateway to VAX in order to run IBM sessions on VAX workstations.

"Our user population uses both, and we wanted to not have dual pieces of equipment," he added.

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Margolis

CONTINUED FROM PAGE 81

Because first, they'd have to leave DEC or HP, said another venture capitalist who has spent time pondering the same question. This is because an overwhelming preponderance of even those who are still twentysomething are more comfortable with risk if it ends with a c.

"A lot of today's entrepreneurs have forgotten what's involved in entrepreneurship," he said. "I want to start my own company, they tell us, but I want to make $100,000 a year."

Ironically, he said, the success of the last generation of entrepreneurs is serving to stop the start-ups of this generation. "There are so many success stories," he said. "Everyone knows somebody who started a technology company that really took off. It all seems so close, so easy. You think, that's how it happens: You start a company and become a millionaire. You forget how they got there."

The fellow who's telling me this is himself a several-time computer industry entrepreneur; his latest venture, two years out of the starting gate, is his first one on the giving rather than the beseeching side of the venture capital desk. "When my partner and I started our first company," he recalled, "we went without salaries for months." If you wonder what it would be feel like to have your sanity questioned, be suggested, try proposing a paycheck moratorium to someone who has had the run of the laboratories and the pick of the perks at a large computer company.

"Just recently, our company almost did a start-up deal with a guy from one of the big companies," he said. "He had a beautiful product concept, a great business plan, and he was really turned on by the idea of doing it himself. We were excited too; it had winner written all over it." On the eve of the paper-signing, the would-be entrepreneur withdrew from the deal. "He told me he was really sorry," the venture capitalist said, "but he just couldn't leave his corporate dental plan."

Venturers who won't let go of their security blankets, said the venture capitalist, make for venture capitalists who won't let go of their purse strings. This vicious circle goes a long way toward explaining why, when you lift the garage door these days, you're more likely to find Mercedes and BMWs than Steve and Steve and Sandy.

On the other hand, security — like entrepreneurialism — ain't what it used to be. As the industry matures and consolidates, each month brings a new crop of layoffs and downsizings and redundancy cures and job eliminations and other measures that, whatever other problems they might import, at least free the affected folks from dental plan separation anxiety. Back in the 1970s, when the aerospace industry went through the same stage with the same result, some of the new unemployed were shattered. Others made a quick and agile leap to another corporate post. But some, astounded to find that the security for which they had given up entrepreneurial dreams had been illusory all along, started companies.

Where salaries are freezing, entrepreneurial ambitions could be coming to a boil. Got a garage near, say, Maynard, Mass.? Don't padlock the door just yet.

Margolis is *Computerworld's* senior editor, industry.

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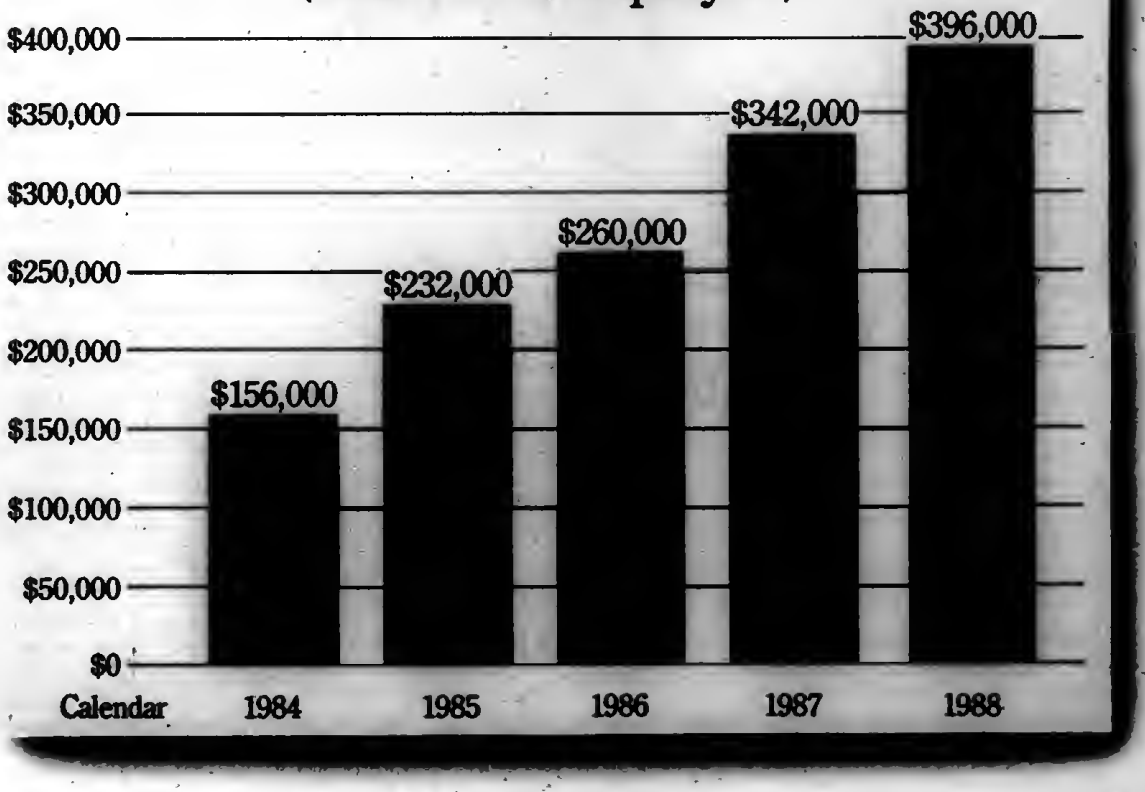

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CDC sale

CONTINUED FROM PAGE 81

Beaumont said he had always viewed Imprimis as an important revenue producer for CDC, adding, "The bottom line is, they apparently needed the cash."

"In effect, [CDC is] going from a very dispersed computer conglomerate to a focused information services company," said Michael Geran, an analyst at Nikko Securities Co. The various draconian measures taken by CDC since the first of the year — which, at latest count, include the sale of its European-based computer maintenance organization to a West German company, announced within days of the Imprimis deal — have probably succeeded in making the company financially viable, he added.

Other observers agreed that the sale made strategic sense. "I think one explanation is [Imprimis] was the least integral to their ongoing business strategy," said Gary Smaby, managing director of Minneapolis-based Needham & Co. "The disk-drive business is nearly a commodity business, and in that sense, Imprimis has always been viewed as a spinout candidate." Indeed, Smaby and others said that at the creation of Imprimis late last year, there was speculation that the unit would be put on the block.

The immediate financial impact of the deal, according to analysts, will be to help CDC retire its $150 million in senior debt, leaving the firm with around $100 million in cash. "So, next year, if the negotiations don't stall, they'll be cash-flow positive and be able to stay out of the bank," Smaby said. For Seagate, which posted revenue of $1.26 billion in its most recently reported fiscal year and is already the world's leading independent drive supplier, the Imprimis acquisition is a watershed event, said IDC analyst Jay Bretzmann. Seagate and Imprimis, he noted, have synergistic product lines and minimal manufacturing overlap.

However, when asked about staff reductions or moves at Imprimis, which employs about 8,500 people worldwide, as a result of the sale, an Imprimis spokeswoman would say only that no changes or reductions are planned. Seagate employs approximately 28,000 people worldwide.

IN BRIEF

Ups and downs

Figures released last week by the American Electronics Association (AEA) showed a 4.4% decrease in the U.S./Japan electronics trade deficit and a 0.4% increase in the U.S./world electronics trade deficit in the first quarter of 1989, compared with the first quarter of last year. AEA President Richard Iverson greeted the news with cautious optimism.

"We would like to see at least three consecutive quarters of improved trade balance, both with Japan and with the rest of the world, before we feel even marginally comfortable," he said.

Senior redeemer

Storage Technology Corp. last week petitioned the Securities and Exchange Commission for approval of a public offering of $100 million in senior subordinated notes. The notes, to be due in 1996, are intended to help redeem Storage Tek's 13.5% senior debt. Storage Tek's debt is also due in 1996. Salomon Brothers, Inc. will underwrite the offering.

Sterling catch

Sterling Software, Inc. is poised to acquire Ottawa-based software developer Zantho Information, Inc. The privately held Canadian firm's flagship offering is the Zim fourth-generation language and application development tool kit, which is aimed at relational database users across a wide variety of platforms.

Chips spring anew

San Jose, Calif.-based semiconductor maker Atmel Corp. will become the new owner of Honeywell, Inc.'s Colorado Springs-based Solid State Electronics division, maker of the RTA CPU chips. Terms of the deal were not disclosed. The acquisition, touted by Atmel President George Perlegos as "an important effort in sustaining a significant U.S.-based semiconductor manufacturing facility," was unanimously voted before the Semiconductor Industry Association confirmed a decline in last month's book-to-bill ratio.

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Plenty of room for QA experts

Global competition is driving expanding interest in quality assurance

BY SHERYL KAY
SPECIAL TO CW

As IS groups strive to produce the biggest bang for their buck, it has become increasingly crucial to enhance systems quality. One result is a growing emphasis on the role of the quality assurance professional.

QA is one of the fastest growing functions within IS, according to William Perry, executive director of the Quality Assurance Institute in Orlando, Fla. The number of quality assurance positions at Fortune 500 companies and comparably sized government agencies has increased at a rate of 25% per year for the past five years, according to research by the institute. The group works with its 1,000 member organizations, both software vendors and users, to enhance information systems quality through conferences and other activities.

One reason for the growing demand for QA is the increasing pressures of global competition, according to Bill Bowl, senior QA engineer at GTE Data Services Corp. in Tampa, Fla.

"We can see the Japanese improving in the software industry, and the Republic of Singapore will also be a giant in a few years," Bowl says. "This is because they are very serious about quality."

As global competition heats up, more U.S. companies will place greater emphasis on quality, and the QA specialist will be depended on even more.

Typically, the QA professional's responsibilities involve reporting on the status of current projects, devising proposals for general quality improvement activities, such as new measurements, and following up by implementing the initiatives.

Information systems QA is still a young field, and there is not a firm consensus among IS groups regarding exactly what it constitutes or how it should be pursued. Some firms find they need only the resources of one QA manager, while others depend on a team of QA analysts.

Quality salesmanship

Whether executed by an individual or a group, the main objective of QA is to "sell quality," says Paul Tex, who is both database and QA manager at the state of Indiana's Information Services Division in Indianapolis. It is therefore important for all QA candidates to demonstrate traits such as leadership, vision, the ability to communicate, enthusiasm and innovation.

A systems professional also should have a strong statistics background, with knowledge of tools such as cause-and-effect graphs and Peretto Charts, a technique adopted from manufacturing QA in which problems are ranked from most severe to least severe.

However, QA professionals tend to say these skills are secondary to personal attributes. Perry notes that information systems QA tends to be less reliant on statistics than manufacturing QA. "Our surveys show that less than 5% of large companies know their [software] defect rate," he says.

Nancie Sill, vice-president of IS at Contel Credit Corp., a leasing company in Atlanta, adds that a good systems background is important. "QA is there to review the work of technical people, and people in technical positions generally respect someone who has done their work and who was recognized as having done it well," Sill said.

Rebecca Staton-Reinstein, director of corporate quality at New York Life Insurance Co., says she finds QA activities personally rewarding. "I can look back and say, 'This was a problem area, this is the process change that we initiated, and these are the dollars saved,'" she says. "It makes you feel good because you know you have really contributed."

However, Bowl says that improvements do not always come easily. "You have to have management commitment and the right environment. The IS people need to be trained, and you need to have a process," he says. "If you don't have any one of these, you can't make QA work."

> "WE CAN SEE the Japanese improving in the software industry, and the Republic of Singapore will also be a giant in a few years. This is because they are very serious about quality."
>
> BILL BOWL
> GTE DATA SERVICES

For individuals who take on the challenge, salaries may or may not be attractive. Perry says that the annual salary for a QA manager can run as low as $20,000 and as high as $120,000, with the average being $52,000. The wide range is due in part to the differing perceptions of QA among organizations, Perry says.

A QA career offers significant growth potential, according to Sill. Her abilities as vice-president in IS reflect the benefits of her seven years in QA at First Atlanta Bank. With their expertise in how things should be done correctly in IS, QA specialists can be attractive candidates for promotions to positions such as business analyst, corporate QA specialist and IS director, she said.

In addition to software vendors, companies most likely to have robust QA departments include defense contractors, because of their contractual responsibilities to the Department of Defense, and companies that have suffered from major systems disasters.

For preparation, Staton-Reinstein advises interested systems professionals to read works by such QA leaders as W. Edwards Deming, Tom Peters, Phil Crosby and J. M. Jaran. She also recommends *Hatching the DP QA Function* by Perry and *Quality Data Processing — The Profit Potential* by Leon Ellsworth and Claude Burrill.

Staton-Reinstein also points to courses offered by the Institute of Electrical and Electronics Engineers and the Quality Assurance Institute.

Kay is a Tampa, Fla.-based business consultant and free-lance writer specializing in emerging technologies and human resources.

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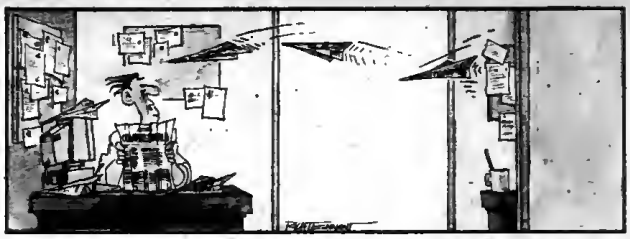

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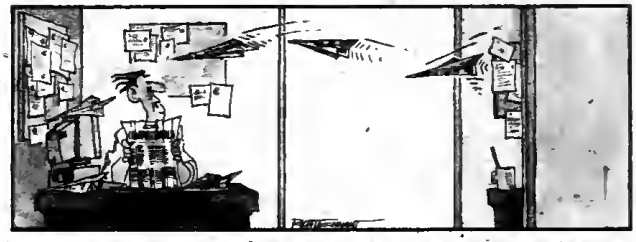

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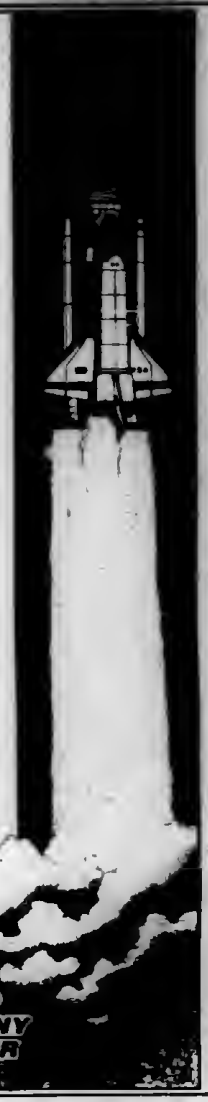

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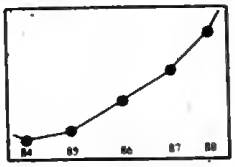

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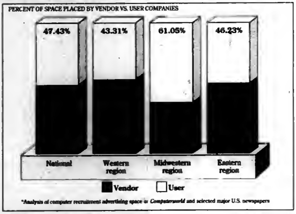

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MARKETPLACE

How to get what you pay for

Before paying bills, managers should verify that services were rendered

It is often difficult to confirm that products or services for which an organization is billed are actually being delivered, and factors such as chargeback schemes and the constant reshuffling of end-user computer equipment only aggravate the difficulties.

Along with a litany of complaints about billing for software and computer services, however, some IS managers offer advice for tackling the problem.

"We're constantly moving equipment around the country or taking equipment out of service," says Ed Burns, vice-president of data center operations at Livingston, N.J.-based CIT Group, Inc., a subsidiary of Manufacturers Hanover Corp. "Either the wrong people are billed or we're billed for equipment no longer in service."

Beleaguered by such problems, CIT hired a person two years ago to work full-time at making sure service billing was in order. The company also purchased a PC-based software package, Computer Assets Tracking System from Bendata Management Systems, Inc., in Dallas, which has since turned the product over to Morino, Inc. in Vienna, Va.

The microcomputer-based package correlates billing with the equipment being serviced and maintained. Burns also looked at a mainframe package from Peregrine Systems in Irvine, Calif., but felt its multiuser capabilities and other features were more than he needed.

For Joe Cloonan, controller in the corporate IS organization at Gillette Co. in Boston, billing difficulties arise in identifying the user departments to which service costs should be charged.

"We've been trying to get our suppliers to make summary statements matching equipment with billings," Cloonan explains. He is working to get the vendors to provide more detail or clearer formats, which vendors might consider beneficial to other customers as well, he notes. "Sometimes it's a long haul," he says. "But this whole area of billing is important because it can control MIS costs, and controlling costs means that a company can remain more competitive."

As at CIT Group, IS managers at Corning-Asahi Video Products Co., a joint venture between Corning, Inc. and Asahi Glass Co. in Japan, are trying to keep track of equipment that is on the move.

"We frequently take terminals and other equipment out, and it's been a constant battle to keep bills in line with our in-house figures. Our people have to monitor everything closely," says Dennis Lockard, Corning-Asahi's manager of information resources.

Furthermore, Corning-Asahi managers are on the receiving end of chargeback invoices from Corning. "From the end user's point of view, it gets to be a real tangled web," Lockard says. "We spend a lot of time and energy trying to keep things straight."

The job of clearing up the confusion and avoiding unnecessary expenses got a boost from a house cleaning. "Several years ago we had a major cleanup effort where we saved many dollars just by auditing what was installed against vendor invoices," Lockard says.

The longer range solution is a centralized invoice-tracking system. "The best thing we can do is have a good systematic way of showing me what it is I'm paying for," Lockard says. Currently, he uses separate tracking systems for the data center and telecommunications services.

Such a system should allow analysis of trends and incorporate all the controls of a sound management information system, Lockard adds. "It has to be auditable — I have to be able to go back and find the source documents," he says.

Roger Peterson, director of Information Systems at Kawasaki Motors Corp. U.S.A. in Irvine, Calif., says he once had to cope with a software vendor billing his company nine months in advance for service.

Peterson's advice, based on 11 years of handling product and service contracts, is to establish clear terms for billing at the time contracts are negotiated.

"If they see you mean business, they'll bring more to the table," Peterson says. "It's just like a zillion little things. There's a lot more to negotiating these things than looking at the price list and asking, 'OK, does that include tax?'

"There was a time when I was embarassed to ask about these things," he adds. "But they're rarely going to tell you that you have a stupid idea. You might hit on a point where their policy is flexible."

> "THERE'S A LOT more to negotiating these things than looking at the price list and asking, 'OK, does that include tax?' "
>
> ROGER PETERSON
> KAWASAKI MOTORS

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Buy/Sell/Swap

The BoCoEx index on used computers

Closing prices report for the week ending June 9, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	$500	$625	$400
XT Model 086	$850	$1,150	$850
XT Model 089	$1,200	$1,400	$950
AT Model 099	$1,725	$1,850	$1,500
AT Model 239	$1,800	$2,100	$1,775
AT Model 339	$1,925	$2,000	$1,800
PS/2 Model 50	$2,150	$2,400	$2,000
PS/2 Model 60	$3,075	$3,100	$2,500
Compaq Portable I	$625	$750	$625
Portable II	$1,800	$2,100	$1,700
Portable III	$2,875	$2,950	$2,300
Portable 386	$1,750	$2,000	$1,675
Plus	$900	$1,200	$900
Deskpro 386	$2,000	$2,350	$1,800
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Apple Macintosh 512	$550	$650	$300
512E	$675	$975	$600
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II	$3,550	$4,175	$3,425
NEC Multispeed	$800	$825	650
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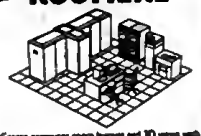

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Become an agent of change

Training managers can propel shifts in the way business is conducted

BY EDMOND DROUIN
SPECIAL TO CW

There are at least two principal levels on which information systems training managers and their staffs should seek to contribute to their organizations as agents of change.

The first level involves discovering the potential for major changes in how the organization conducts its business.

A few years ago, some members of my training staff and I became concerned about the quality of work life for maintenance programmers in our company. Many programmers who were maintaining older Cobol and PL/I systems saw their work as boring and insignificant.

We looked for a maintenance workshop that would meet two needs: enable the workers to improve their skills and techniques and also help them feel more stimulated and challenged. We found such a workshop, sent three trainers to try it out and then brought it into the firm.

But the managers we contacted expressed no interest in such a workshop and saw no value in one because to them, as one said, "Maintenance is just a boring, dull job by its nature."

We did not give up, though. We found one manager who agreed to send 15 of his people. Their feedback was extremely positive, and word spread throughout the shop. Other managers became interested, and we offered a managers' overview of the workshop with testimonials from people who had attended. Within three months, the workshop became a company standard for all programmers.

This kind of success is possible for anyone. The important thing to remember is that training managers and their staff members can generate positive changes in the way their organizations conduct business. The keys to the doors to change reside chiefly in your imagination. Ask yourself, what could be done in a better manner? Where do you hear complaints? How can you help?

The second level for initiating change involves effective training. What are the anticipated results of training programs? Do you expect students to say that they were pleased when they fill out the appreciation forms that we call evaluations? Far too many trainers rely on those ratings for their own satisfaction.

The true and lasting source of a manager's satisfaction should be in forging changes in the behavior of students. But how many of our training programs do that?

I would like to suggest a model of behavioral change that may help managers see how to impart such change: K + S + A + EE = BC. Translated, the formula means: Knowledge plus Skill plus Attitude plus Enabling Environment will result in Behavioral Change.

Knowledge without skill will not yield much. If I know about something but cannot do it, how productive will I be? Changes in behavior require appropriate skills.

If I know about the thing and can do it but do not really care whether I do it, how productive will I be? Changes in behavior require the right attitude.

Finally, if I know it, can do it and want to do it but my boss will not let me, nothing happens. Changes in behavior require an enabling environment.

> THIS KIND of success is possible for anyone. The important thing to remember is that training managers and their staff members can generate positive changes in the way their organizations conduct business.

Trainers are in the change business, and they need to consider all pieces of the model to be sure that people can and do make the required behavioral changes.

Note that it is impossible to act on all pieces of the model in one course or workshop. Sometimes, trainers need to provide the knowledge before starting with skills training. Sometimes, they need to deal with the makeup of the environment before tackling the skills.

Consider the example of training programmers to use Oracle Corp.'s Oracle or some other relational database product. If the IS unit already has IBM's DB2 or Sybase, Inc.'s Sybase, trainers probably need to provide managers with an overview of Oracle and a comparative analysis of its capabilities compared with DB2 or Sybase. This gives managers some knowledge and helps to create the enabling environment in which they will support the use of the new tool.

Next, trainers can provide knowledge and skill training for the programmers. During training, you could try to help them develop a positive attitude toward the use of their new skills.

If you wait to be asked to initiate change, you will have waited too long. Examine your organization and take responsibility for instigating change and for making things better. Grab the role, fill the void, and treat your organization as though you owned it and cared for it. Then you will know the satisfaction of being a trainer and a change agent who makes major contributions to the organization.

Drouin is director of DP education & training at Liberty Mutual Insurance Co. in Portsmouth, N.H.

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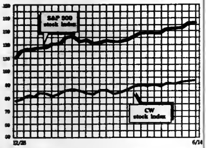
STOCK TRADING INDEX



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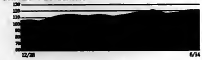
Communications

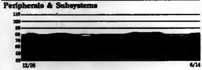
Computer Systems

Software & DP Services



Semiconductors

Peripherals & Subsystems



Leasing Companies

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 14, 1989

EXCH		52-WEEK RANGE		PRICE CLOSE JUNE 14, 1989	WEEK NET CHNGE	WEEK PCT CHNGE
	Communications and Network Services					
N	AMERICAN INFO TECHS CORP	52	44	58.875	-1.6	-2.7
O	ANDREW CORP	22	16	21.75	-0.3	-1.1
O	ARTEL COMM CORP	7	2	5.875	0.0	0.0
N	AT&T	37	24	35.875	-0.1	-0.3
O	AVANTEK INC	7	4	4.875	-0.1	-2.5
N	AYDIN CORP	18	13	16.625	2.5	19.5
N	BELL ATLANTIC CORP	92	86	87.25	-4.4	-4.8
N	BELLSOUTH CORP	52	39	48.75	-0.8	-4.4
O	COMPRESSION LABS INC	9	3	7.75	-0.8	-8.1
O	COMPUTER NETWORK TECH	2	1	1.938	0.1	8.1
O	CONTEL CORP	63	33	60.625	-1.0	-1.8
O	DATA SWITCH CORP	6	4	4	-0.1	-3.0
O	DIGITAL COMM ASSOC	28	17	22.5	-1.0	-4.3
O	DYNATECH CORP	23	17	17.25	-0.3	-1.4
O	FIBRONICS INTERNATIONAL INC	7	3	6.625	-0.8	-8.8
O	GANDALF TECHNOLOGIES	8	4	5.125	-0.4	-6.8
O	GENERAL DATACOMM INDS	9	3	5.25	-0.3	-4.5
N	GTE CORP	56	28	53.375	-1.9	-3.4
O	INFOTRON SYS CORP	13	10	11.75	1.8	17.5
N	ITT CORP	61	46	58.875	-1.3	-2.1
N	M A COM INC	11	6	8.375	0.1	1.5
O	MCI COMMUNICATIONS CORP	42	14	39.125	-0.8	-0.8
N	NETWORK EQUIPMENT TECH INC	25	14	23.5	-0.8	-2.1
O	NETWORK SYS CORP	12	8	8.375	0.3	3.1
N	NORTHERN TELECOM LTD	20	14	19.125	-0.1	-0.3
O	NOVELL INC	28	24	30.25	-1.0	-3.2
N	NYNEX CORP	84	63	80.5	-2.1	-0.8
N	PACIFIC TELESIS GROUP	43	28	40.5	-1.6	-3.6
A	PENRIL CORP	9	3	8	0.4	6.7
N	PLESSEY PLC	48	25	30.75	-3.3	-7.5
N	SCIENTIFIC ATLANTA INC	19	10	18.25	-0.3	-3.3
N	SOUTHWESTERN BELL CORP	54	38	52.125	-1.6	-3.2
O	3 COM CORP	29	19	20.25	-0.3	-1.2
N	U S WEST INC	72	53	69.625	-1.4	-1.6
	Computer Systems					
O	ALLIANT COMPUTER SYS	7	3	4.875	-0.5	-9.8
O	ALPHA MICROSYSTEMS	8	5	6.75	0.6	3.8
O	ALTOS COMPUTER SYS	10	6	6.5	-0.4	-0.9
A	AMDAHL CORP	28	19	21.625	-1.6	-6.5
O	APPLE COMPUTER INC	60	34	49.625	1.4	2.8
N	BOLT BERANEK & NEWMAN	18	7	8.375	0.0	0.0
N	COMPAQ COMPUTER CORP	102	50	96.625	0.0	0.0
N	COMMODORE INTERNATIONAL	20	8	16.6	0.4	2.3
O	COMPUTER AUTOMATION INC	6	3	4	0.6	14.3
N	CONTROL DATA CORP	28	19	21.625	1.5	7.5
O	CONVEX COMPUTER CORP	19	7	13.75	-0.1	-0.9
N	CRAY RESH INC	68	48	52	-0.3	-0.8
O	DAISY SYS CORP	11	3	3.625	-0.1	-3.3
N	DATA GEN CORP	25	14	19	-0.3	-1.4
N	DATAPOINT CORP	6	3	4.125	0.1	3.1
O	DELL COMPUTER CORP	13	7	7.875	-0.4	-4.5
N	DIGITAL EQUIP CORP	122	89	91.75	-2.1	-2.3
N	FLOATING POINT SYS INC	4	2	3.25	0.6	23.8
N	HARRIS CORP	34	25	33.375	1.0	3.1
N	HEWLETT PACKARD CO	62	44	52.5	-1.6	-3.4
N	HONEYWELL INC	80	57	74.375	-1.6	-2.5
N	IBM	131	106	110.375	0.6	0.8
O	INFORMATION INTL INC	16	13	15.25	-0.3	-1.6
O	IPL SYS INC	8	2	8	-0.3	-3.0
N	MAI BASIC FOUR INC	21	7	6.625	-0.3	-0.8
N	MATSUSHITA ELEC INDL LTD	219	160	162	-8.8	-5.0
O	MENTOR GRAPHICS CORP	46	23	39.25	0.5	1.3
N	NBI INC	9	1	1.875	-0.1	-6.8
N	NCR CORP	70	51	55.875	-1.5	-8.8
N	PRIME COMPUTER INC	21	12	16.375	-0.1	-0.3
O	PYRAMID TECHNOLOGY	20	9	11.25	0.9	8.4
O	SHAREBASE CORP	4	2	2.375	0.0	0.0
O	SILICON GRAPHICS CORP	25	14	18.6	-0.9	-3.3
O	STRATUS COMPUTER	36	21	30.25	-1.8	-5.8
O	SUN MICROSYSTEM INC	23	13	18.25	-1.6	-8.4
O	SYMBOLICS INC	3	1	1.938	0.1	3.4
O	SEQUENT COMPUTER SYS INC	28	14	23.75	-1.6	-6.8
N	TANDEM COMPUTERS INC	21	12	18	-0.3	-2.7
N	TANDY CORP	48	38	46.375	0.9	1.6
N	ULTIMATE CORP	14	8	10.75	-1.0	-8.8
N	UNISYS CORP	38	25	26.25	-1.6	-4.5
A	WANG LABS INC	11	7	8	-0.1	-1.5
	Software & DP Services					
O	ADVANCED COMP TECH	4	1	1.75	0.8	27.3
O	AMERICAN MGMT SYS INC	19	12	13.625	-0.3	-3.5
O	AMERICAN SOFTWARE INC	18	8	17.6	0.9	1.4
N	ANACOMP INC	12	9	6.375	-0.4	-9.8
O	ANALYSTS INTL CORP	25	8	20	0.8	1.6
O	ASHTON TATE	28	17	18	-4.5	-20.9
O	ASK COMPUTER SYS INC	19	12	13.75	-0.3	-6.0
O	AUTODESK INC	40	23	36.875	-0.8	-8.0
N	AUTO DATA PROCESSING	42	26	40.375	0.4	0.9
O	BMC SOFTWARE INC	21	8	16.75	0.9	2.5
O	BOOLE & BABBAGE INC	20	6	18.5	-0.3	-1.3
N	BUSINESSLAND INC	19	10	13.125	0.6	5.6
N	COMPUTER ASSOC INTL INC	44	24	40	-1.5	-9.8
O	COMPUTER HORIZONS CORP	12	7	7.75	0.1	1.6
N	COMPUTER SCIENCES CORP	59	41	54.75	-1.0	-1.8
O	CORPORATE SOFTWARE	18	9	18	1.8	12.3
N	COMPUTER TASK GROUP INC	17	12	13.25	-0.5	-3.6
O	COGNOS INC	8	5	6	-0.1	-2.0
O	COMSHARE INC	26	16	34.75	0.3	0.7
N	CULLINET SOFTWARE INC	6	4	6	0.1	1.6
N	GENERAL MTRS (CLS E)	54	37	52.125	-0.8	-1.4
O	HOGAN SYS INC	7	3	6.125	-0.3	-7.8
O	INFORMIX CORP	25	7	6.625	-0.8	-4.9
O	INTELLICORP INC	5	2	4.25	0.0	0.0
O	KEANE INC	19	9	15	1.8	13.2
O	LEGENT CORP	28	16	25.5	-1.0	-0.8
O	LOTUS DEV CORP	27	15	28	0.6	1.5
O	MANAGEMENT SCI AMER	14	8	11.625	0.6	5.7
O	MICRO PRO INTL CORP	4	2	2.5	-0.5	-8.1
O	MICROSOFT CORP	71	46	57.75	-0.8	-3.3
N	NATIONAL DATA CORP	34	16	32.75	0.1	0.8
N	ON LINE SOFTWARE INTL INC	9	4	6.625	-0.3	-0.8
O	ORACLE SYS CORP	33	15	32.375	1.8	4.0
N	PANSOPHIC SYS INC	19	12	14.125	-0.1	-0.9
O	PHOENIX TECHNOLOGIES INC	19	12	12.5	-0.8	-0.8
O	POLICY MGMT SYS CORP	31	21	30	-0.4	-1.2
O	PROGRAMMING & SYS INC	19	11	18	-0.4	-0.0
O	RABBIT SOFTWARE INC	3	1	1.25	0.1	11.1
O	RELATIONAL TECHNOLOGY INC	21	8	10.125	-1.6	-9.0
N	REYNOLDS & REYNOLDS CO	34	18	30.375	-0.8	-0.9
O	SEI CORP	22	18	18.5	-0.3	-1.6
O	SHARED MED SYS CORP	23	14	17.25	-0.1	-0.7
O	SAGE SOFTWARE INC	10	6	8.125	-0.1	-1.4
O	SOFTWARE PUBS CORP	26	18	24.25	0.9	1.6
A	STERLING SOFTWARE INC	8	5	7.125	0.4	6.6
O	SUNGARD DATA SYS INC	25	13	17.75	2.5	16.4
O	SYSTEMATICS INC	37	28	28	0.9	0.7
N	SYSTEM CENTER INC	25	13	24.5	0.8	3.2
N	SYS. SOFT INC	27	11	24.75	-1.5	-5.7
	Semiconductors					
N	ADV MICRO DEVICES INC	17	7	10.125	-0.1	-1.2
N	ANALOG DEVICES INC	16	10	11.25	-0.1	-1.1
O	ANALOGIC CORP	11	7	10	-0.4	-0.8
O	CHIPS & TECHNOLOGIES INC	28	11	22.75	-1.6	-7.1
O	INTEL CORP	37	19	30.25	-0.0	-0.8
N	LSI LOGIC CORP	14	8	10.5	-0.3	-0.7
N	MICRON TECHNOLOGY INC	28	18	24.625	1.8	5.3
N	MOTOROLA INC	60	25	55.875	-0.8	-1.8
N	NAT'L SEMICONDUCTOR	15	7	7.125	-0.1	-1.7
N	TEXAS INSTRS INC	51	26	41.875	-1.1	-0.8
A	WESTERN DIGITAL CORP	16	11	10.75	-0.4	-3.4
	Peripherals					
O	ALLOY COMP	4	1	1.75	0.0	0.0
N	AM INTL INC	6	4	5.375	-0.1	-3.3
O	AST RESH INC	17	7	9.5	0.8	8.6
O	AUTO TROL TECH CORP	6	4	5.25	0.0	0.0
O	BANCTEC INC	16	9	13.375	-0.3	-4.5
O	CIPHER DATA PRODS INC	11	6	6.75	0.0	0.0
A	COGNITRONICS CORP	5	2	6.125	0.6	17.1
O	CONNER PERIPHERALS	15	7	14	0.9	4.7
A	DATAPRODUCTS CORP	16	10	13.25	0.6	2.9
A	DATARAM CORP	11	7	8.875	0.6	6.6
N	EASTMAN KODAK CO	52	42	48.125	-1.4	-2.7
O	E M C CORP MASS	6	3	6.5	0.0	0.0
O	EMULEX CORP	12	6	9.25	0.1	1.4
O	EVANS & SUTHERLAND	22	13	18.6	-1.5	-7.5
O	ICOT CORP	4	2	2.25	0.0	0.0
O	INTERLEAF INC	14	9	8.875	0.3	2.5
O	IOMEGA CORP	5	2	2.563	-0.1	-4.7
O	LEE DATA CORP	4	2	3.625	0.0	0.0
O	MASSTOR SYS CORP	4	2	2.063	0.0	0.0
O	MAXTOR CORP	14	6	9.375	-1.0	-9.8
O	MICROPOLIS CORP	16	6	6.75	0.9	4.5
O	MINISCRIBE CORP	14	1	2.375	0.2	8.5
N	MINNESOTA MNG & MFG CO	75	26	73.375	-0.8	-1.0
O	PERSONAL COMPUTER PRODUCTS INC	8	4	4.313	0.1	1.6
O	PRIAM CORP	2	1	0.625	-0.1	-9.8
O	PRINTRONIX INC	11	7	6.75	0.6	2.9
N	QMS INC	10	6	8.875	0.9	10.9
O	QUANTUM CORP	20	8	18.375	-0.6	-3.3
N	RECOGNITION EQUIP INC	12	9	10.5	3.1	42.4
O	REXON INC	8	6	7.625	0.4	5.2
O	SEAGATE TECHNOLOGY	16	7	15.25	1.6	8.9
N	STORAGE TECH CORP	26	11	15.375	-0.8	-3.1
O	TANDON CORP	3	1	0.563	-0.1	-15.2
N	TEKTRONIX INC	27	19	23.125	-1.0	-4.1
O	TELEVIDEO SYS INC	1	0	0.344	0.0	-8.8
N	XEROX CORP	69	52	63.375	0.0	0.0
	Leasing Companies					
O	AMPLICON INC	115	11	13.75	0.1	0.9
O	CAPITAL ASSOCIATES INTERNATIONAL INC	9	5	7.5	-0.1	-1.6
N	COMDISCO INC	26	16	26.125	-1.0	-3.7
O	CONTINENTAL INFO SYS	7	0	0.688	0.2	37.6
O	LDI CORPORATION	17	12	16	0.5	3.2
O	PHOENIX AMERN INC	6	3	2.375	0.1	3.8
O	SELECTERM INC	9	5	6.75	0.1	1.4

EXCH:N—NEW YORK;A—AMERICAN;O—NATIONAL

Another drop

Tech firms continue to pay a high price for poor performance

Stock drops in the wake of company comeuppances are getting to be a weekly event in the tech sector. Last week was Ashton-Tate Corp.'s turn, with an announcement of an impending second-quarter loss because of an unforeseen inventory backlog. Ashton-Tate's stock fell 4½ points to a Thursday close at 17¾. Disillusionment is contagious; Microsoft Corp. closed at 56¾, down 3 points. Recovery can be quick, however: Last week's bearer of bad tidings, 3Com Corp., picked up 2½ points to close at 20¾.

Continued takeover rumors moved Cullinet Software, Inc.'s stock up ¼ of a point to 7¾ at the week's end. Likewise, Prime Computer, Inc. hinted of a bidder to parry MAI Basic Four, Inc.'s hostile offer; Prime closed at 16¾, up ¼ of a point. A rumor that Intel Corp. will be tapped as AT&T's leading PC supplier reached out and touched no one; Intel ended the week at 29¾, down 1½ points.

IBM, thought to be closing in on an announcement of an I486 daughterboard, closed at 109¾, up 1 point. Compaq Computer Corp. closed at 95¼, down ½ a point. Digital Equipment Corp. closed down 1½ points at 91¼.

NELL MARGOLIS

Barrelful of Apple links targets IBM

BY PATRICIA KEEFE
CW STAFF

NEW YORK — Six months after the conclusion of its self-declared "Year of the Network," Apple Computer, Inc. finally rolled out a slate of IBM connectivity products alongside plans for multivendor support that it hopes will crack open information systems wallets.

Last week's product barrage showcased plans to support a quartet of strategic environments — IBM, Digital Equipment Corp., Open Systems Interconnect and Transmission Control Protocol/Internet Protocol (TCP/IP).

Apple also tipped its hat to the installed base of more than 340,000 Macintosh networks by unveiling the long-awaited Appletalk Phase 2 and Internet Router. According to Apple, these two products together support as many as 16 million nodes spanning a range of hardware platforms that run over a variety of networks.

The communications and data processing group at Hughes Aircraft Co. has a huge Ethernet network and needed relief from Apple's 254-address limit, according to systems engineer Morris Balamut.

In all, Apple introduced 15 products (CW, June 8) and referred to related offerings from another 20 third parties.

While the announcement relieved Appletalk devotees and clearly eliminated "checklist" obstacles to Fortune 1,000 sales, some doubts linger.

Apple's entrance into IBM communications could be seriously hampered by bad timing because its introductions took place in the shadow of IBM's graphically oriented Officevision debut.

Don Casey, Apple's vice-president of networking and communications, criticized IBM's delivery schedule and claimed that IBM had introduced four new user interfaces, while Apple continues to maintain the same user interface, thus shielding users from technologic underpinnings.

Industry observers are split on the potential impact of Officevision. George Klaus, president of Hughes LAN Systems, which co-developed Apple's Token-Ring card, maintains that the product will enable users in predominantly IBM shops to buck MIS objections to Macintosh purchases.

Others are not so sure. They see IS opting to substitute Officevision for the Mac. They also foresee resistance to Apple's Tokentalk card as a direct-connect vehicle because of its $1,250 sticker price. Apple has positioned the card as a gateway.

A related issue concerns Apple's announced support for IBM's Server Message Block (SMB) file-transfer protocol, said Chuck Stegman, a manager at Businessland, Inc.'s Advanced Systems Division. Mac users cannot exchange files with DOS workstations in a gateway situation, Stegman said.

Apple could either lower the price of Tokentalk for workstation use or provide SMB file transfer independently of the network media, he suggested.

There was also some grumbling about the lack of TCP/IP support at a meeting of Managing Apple Computers in Information Systems, a national user group. Richard Mandelbaum, the vice-provost for computing at the University of Rochester in New York, said he was disappointed with Apple's TCP/IP support and complained that Apple has not yet adopted TCP/IP's network management protocol.

User group tunes in

Apple's focus on integration last week could not have been more timely for a group of users meeting in Chicago.

While Apple rolled out 16 communications and networking products in New York, more than 150 Macintosh users were attending a meeting of the national user group MACIS — Managing Apple Computers in Information Systems. Attendees, treated to a video teleconference wrap-up of the product introductions later in the day, were generally pleased, if not surprised, by the connectivity announcements.

"Apple pretty much pushed their connectivity strategy along," said Joe Mambretti, manager of planning at the University of Chicago, which claims to be one of Apple's largest installations, with around 4,000 Macintoshes.

During an audience question-and-answer session via a teleconferencing link, Apple Chairman and Chief Executive Officer John Sculley fielded several questions about Apple's service organization and its intention to put more emphasis on third-party and dealer channels.

Lockheed Missiles and Space Co.'s Mike Bailey, for example, told Sculley he was concerned about the apparent reemphasis on dealer channels and whether this meant a move away from Apple's national accounts organization. Sculley said, "All the economies in our industry say it's better to use resellers for many things and dealers for simpler products." However, he added, Apple will "continue to honor and support" its existing direct relationships with users.

ELLIS BOOKER

Microsoft puts SQL in Windows

BY DOUGLAS BARNEY
CW STAFF

REDMOND, Wash. — Microsoft Corp. is preparing to counter the data access ability of Lotus Development Corp. 1-2-3 Release 3.0 with Q+E, a product that allows Windows applications to generate SQL queries, the firm said.

1-2-3 Release 3.0, set to ship this week, contains Blueprint, a communications specification that can also generate IBM SQL code, and will run against a variety of back-end database systems.

Q+E will work only with Ashton-Tate Corp. Dbase databases at first, but it is being enhanced to access both IBM's OS/2 Extended Edition and the Ashton-Tate/Microsoft SQL Server, Microsoft announced. These enhancements are scheduled to be available by year's end.

The system, which runs under Microsoft Windows, uses pull-down menus to generate query-by-example requests, which are then translated into SQL. Users can also generate SQL directly for more demanding queries.

The package was developed by Pioneer Software Systems, Inc. in Raleigh, N.C., and is similar to Dquery, a system from Quadbase Systems, Inc.

Microsoft's initial thrust will be into the installed base of PC Excel users. Q+E will be available to new Excel customers for $10. Existing customers can buy Q+E for $50.

The system will work with any Windows application via the Windows clipboard or can import data directly into any application that supports Dynamic Data Exchange, said George Woltman, president of Pioneer. Pioneer is free to license Q+E to other vendors.

Different focus

The system has an incomplete implementation of SQL and is focused on generating queries rather than providing sophisticated updating capabilities. There are no Create Table, Insert or Update commands, Woltman said.

Q+E works with both Dbase III Plus and Dbase IV, which includes SQL. Q+E does not use Dbase IV's SQL, however, which has been criticized for occasionally providing incorrect results. In fact, Q+E has two different dialects of SQL — one that is ANSI-standard and one that uses Dbase IV syntax. "The same bad features in their SQL, we will have just like them," said Woltman of Dbase IV's SQL. Woltman added that Q+E will achieve correct results.

Beta tester Dave Hart already loves the product. Q+E is used to query data created with Excel but then stored as Dbase files, said Hart, a programmer at Canaan Analytics, Inc., an outside consultant to the Du Pont Co. pension fund investment group. Prior to Q+E, these queries were performed with macros, a time-consuming process.

Power play

The cooperative processing ranks continued to expand last week to include Computer Consoles, Inc. (CCI), which announced a Microsoft Windows front end to its Unix-based office automation software.

The system, dubbed Powerwindows, can tie users to the firm's Officepower back-end system. Both Officepower for Unix minicomputers and Powerwindows for the personal computer are examples of CCI's "open architecture" under which the firm's formerly proprietary software will run on a wide variety of hardware. In fact, Officepower will now run on any minicomputer that uses AT&T's Unix System V, a spokesman said. With a single PC, CCI's Officepower office automation tools, Unix commands and DOS programs can reportedly execute and exchange data.

According to the company, some 100,000 people currently use Officepower to handle text processing, electronic mail, database management and document conversion. A five-user Officepower license sells for $1,995. Powerwindows costs $650. The products are currently shipping.

DOUGLAS BARNEY

Kodak

FROM PAGE 1

mal vendor relationship," said Kodak spokesman Paul Allen. "IBM has also submitted a proposal that we're looking at, but it's premature to talk about what may or may not be done."

If the contract is signed, Kodak would be the largest of several firms to turn over IS operations in facilities management contracts in the past two years. These include Enron Corp., Freeport McMoran, Inc. and Meritor Financial Corp. with EDS and Southland Corp. with Affiliated Computer Systems, Inc.

Kodak has three large data centers in the Rochester area. In one plan under consideration, said a Kodak employee, the chosen vendor would build a new data center to consolidate the three. Further stages of what Kodak is calling the "data center project" could involve some of the 30 data centers elsewhere in the $17 billion company's worldwide operations.

Allen declined comment on the possible impact on Kodak's IS employees. In typical EDS facilities management contracts, the customer's data center workers become EDS employees. One observer estimated the number of Rochester data center employees at 400.

The choice of EDS "would be a natural for Kodak," said Stephen McClellan, a financial analyst who follows EDS for Merrill Lynch. McClellan said EDS performs about $25 million annually in contract work for Kodak.

The office of Katherine M. Hudson, Kodak's vice-president and director of corporate IS, referred all inquiries to Allen.

Consolidation appears to be the direction elsewhere within Kodak. Last week, the firm said it will combine its three U.S. consumer photo divisions into one unit, resulting in several hundred layoffs.

War-weary IS directors remain true to AS/400

BY ROSEMARY HAMILTON and ROBERT MORAN
CW STAFF

Chances are most information systems directors overseeing IBM Application System/400s could use a vacation right about now.

For these users, particularly those coming from a System/36 background, it has been a long, hard year. Despite the war stories they now tell, however, AS/400 users are still committed to IBM's midrange system and predict a long future with it.

"Operations have smoothed out quite a bit now, but for the first four months, I wondered if I should have gotten it," said Phyllis Bordeaux, data processing manager at the IS department in Orange County, Texas.

Bordeaux's story is similar to those told by many former System/36 users. AS/400 simply would not accept certain chunks of System/36 codes. Migration aids were difficult to use, and once an application was running in System/36 mode, the performance was at times worse than it was on the old system.

"I think we were more optimistic than we should have been," said Vincent Monitto, DP director at the New York State Lottery in Albany. "That was based on IBM's marketing implications — the system for non-technical people."

Kendall's Cipolla

From the start, however, IBM did indicate that migration would be more difficult for System/36 than for System/38. Users said they were just not prepared for the extent of the difficulty.

First of all, System/36 shops typically had less technical expertise than the larger System/38 shops because it was not required to run the less technically complex System/36. Ironically, they would need more expertise than their System/38 counterparts. The AS/400's technical design was similar to that of a System/38, and therefore, the System/36 programs would require more work to be migrated.

IBM countered this problem in a number of ways. It worked directly with some customers at their sites and brought others to Rochester, Minn., for migration instruction. IBM also sent out dozens of Program Temporary Fixes (PTFs), intended to enhance operations in System/36 mode. In fact, it sent so many PTFs that users began complaining that it took too long to install all of them (see related story page 25). Last week, an IBM spokesman said the company is now addressing the PTF issue and will send out fewer — and more simple — PTFs in the future.

One of the few System/36 shops that had a relatively trouble-free migration was Kendall Co. According to Ron Cipolla, Kendall's MIS director, his staff was more prepared because its environment evolved from an IBM mainframe to a System/36 and then to the AS/400.

"You have to go after it from a different perspective than a typical 36 shop might," Cipolla said. "There isn't an awful lot that the AS/400 doesn't do that a mainframe does. It has more of a mainframe orientation than a 36 does."

Yet Dennis Klinger, MIS director at Ryder Truck Rental, Inc., a user site that runs IBM mainframes along with AS/400s, said the migration was far more difficult and expensive than he anticipated. "The care and feeding of the operating system was a strain the first year," he said.

Users, however, said that with most migration problems behind them, they have no regrets. "We anticipated some rough times, and there have been," said Frank Campbell, MIS director at the Jefferson Regional Medical Center in Pine Bluff, Ark. "But we expect to be a loyal AS/400 user."

IBM wanna hold your hand

Most Application System/400 users point to IBM's support as the key in getting them through their tough migrations. IBM, it appears, is so determined to succeed with its AS/400 that it will do virtually anything to keep customers happy. The company even quietly instituted a policy several months ago of calling every U.S. customer after their system is installed to make sure all is well. That means IBM has made at least 10,000 follow-up calls, and that is just one piece of the support effort.

As a result of IBM's hand-holding, users are willing to take the pain that often comes with the AS/400 migration. Dennis Klinger, MIS director at Ryder Truck Rental, Inc., still has an outstanding list of improvements he wants IBM to make. Nonetheless, he offered praise for IBM's guidance and support.

James Louys, a vice-president at ADM, Inc., a consulting firm in Cheshire, Conn., said IBM has fussed over users to the point of overreacting. "They've put the emphasis on not getting a bad reputation," Louys said. "They swarm problems with people and money and resources. They'd be on your doorstep if they felt it was necessary."

Slump

FROM PAGE 1

brought to Rochester, Minn., home of the AS/400, for a week's worth of additional migration support. In addition, the spokesman said IBM plans to open 12 migration centers in the U.S. by the end of the summer.

"If there's one thing we could have done better, it would have been to do more training last year instead of this year," said Stephen Schwartz, an IBM vice-president who heads up its Application Business Systems division. "I wish we had more time to do it last year, but we ran out of time."

IBM's Schwartz blames time constraints for lack of training

IBM also plans at least two tape-drive announcements this year, according to Schwartz.

"They have a real problem," he said of the high-end users. "It got here because of a program we had that fell out. But we've been aware of it and have been working on it for a while."

Schwartz said the 2440 tape drive, which high-end users are now using, will get a performance boost. He added that a new tape drive, developed in conjunction with a third-party vendor, will be announced.

Observers said that if IBM comes through on those promises, then it has a solid chance to build on the successes of last year.

"I would say they've done very well in most areas, with some obvious shortfalls," said James Louys, a vice-president at ADM, Inc., a consulting firm in Cheshire, Conn. "It's clear they're very sensitive to problems. They don't want a marketing mistake or an unhappy customer to give this a black eye."

Since last June, IBM has worked hard to avoid problems; in the process, it met two critical objectives with the AS/400. First, IBM finally gave its midrange users a future that made sense and thus prevented many of them from defecting to other vendors. Previously, IBM offered two incompatible systems, both of which had limited growth potential. At the same time, IBM gave no indication of which of those systems was a strategic product in the company's eyes.

Second, IBM attempted to win back midrange market share that it had been losing to Digital Equipment Corp. and other competitors for years. Analysts claim that IBM has made a respectable showing here, although they do not provide specific numbers. IBM claims that one-third of the more than 30,000 AS/400s shipped have gone to non-System/36 and 38 accounts. But it does not specify how many of those customers were non-IBM users.

The key now is to bring over more users, from both within the IBM midrange world and from the competitors' camps. Observers said most of the installed midrange base that was ready to upgrade has already done so. Now IBM must lure those users who do not have pressing migration plans. Clearly, IBM is trying to woo them. For example, in April, IBM quietly released a promotional offer that will give current System/34, 36 and 38 users a 20% discount on the purchase of the OS/400 operating system.

Non-IBM accounts will be a tougher sell, observers said. IBM plans a steady stream of enhancements to keep the AS/400 competitive while also playing up the hand-holding it can give users.

Coming soon to an AS/400 near you

The next big step for the Application System/400 will not come until next year, when several new high-end models and an operating system release with cooperative processing capabilities are expected to be announced, observers said last week.

IBM was characteristically mum last week on future hardware and software announcements.

However, Stephen Schwartz, an IBM vice-president and general manager of its Application Business Systems division, said the organization will forge ahead with its plans to showcase new technologies on the platform. These include image, for which pilot projects are already under way, voice and data applications and expert systems.

An IBM spokesman said the future operating system will include support for "system coupling," which be described as "more like clusters, rather than tightly coupled."

Observers expect new high-end models in 1990

Information war on in China

BY PATRICIA KEEFE
CW STAFF

"... I should tell you there is a soldier by my side."

That refrain reverberated throughout China last week as Communist Party officials sought to slam the Bamboo Curtain down across international telecommunications lines.

The information flow fostered by China's technology revolution is interfering with the government's whitewash of its bloody crackdown on student protesters.

Echoing attempts by Chinese students in the U.S. and abroad to spread information about the unrest and subsequent repression in China [CW, June 12], the Chinese government has turned to its own network of informers and is reportedly using localized computer databases to track down dissidents and "counter-revolutionaries."

"This is so clearly an information war now" between the students, their supporters and the Chinese government, said Jeffrey Stamps, a co-founder of Networking Institute, Inc., a research and consulting company based in Newton, Mass.

Networks and databases have become the next level of defense for frustrated Chinese students in the U.S. Several student groups — including two at Stanford University and the University of California at Berkeley — have set up centralized repositories to collect information flowing into bulletin boards such as Usenet's Newsnet, which can be accessed from Bitnet or Internet.

Newsnet's soc.culture.china mailbox has generated a phenomenal amount of traffic, including messages from the Far East, said David Wasley, manager of data communications and network services at the Berkeley campus.

One example of the chilling nature of the messages received is a June 3 missive from Canada, alleging 7,000 people killed in Beijing. "Machine guns were used against the demonstrators; streets are covered with blood and bodies."

The China Information Center (CIC), an Auburndale, Mass.-based nationwide hot line launched May 17, took steps last week to computerize its operations and beef up phone service. The hot line is sponsored by the Walker Ecumenical Exchange, an international study and education center.

Hundreds of calls

After CIC's 24-hour hot line number was broadcast by the Voice of America before and after the Tiananmen Square debacle, literally hundreds of collect calls began streaming in from within China, Stamps said. "Sunday morning as the massacre was under way, the hot line received many eyewitness reports, some literally three blocks away from the square." Since the crackdown, the volume of calls has dropped markedly.

CIC's efforts to upgrade its facilities has been assisted by donations of equipment and services from the high-tech community. Aid has come from Executone Systems, Inc., AT&T, New England Telephone Co., Lotus Development Corp. and Ashton-Tate Corp. Compuserve is considering donating several mail accounts.

Building a database is a top priority. "As students begin to be arrested and disappear, we are getting requests for information, such as who saw who, when and under what circumstances," said Rev. Gordon Schultz, director of the Walker center.

"If the government is admitting 1,000 are in detention now, imagine how many there must really be," Stamps added.

The database and recordings of calls are intended to provide current information and collect evidence in case international or Chinese legal tribunals ever convene to bring the architects of the Tiananmen Square bloodbath to trial.

"This massacre is burned in the brains and hearts of the Chinese. These people will find a way to get information out, and [when they do] they will need a network in which to dump their information," Stamps said.

CIC is also exploring alternative methods of relaying information to China. "As each type of communications technology comes under government scrutiny, we try to exploit every other one, but we don't want to telegraph what we are doing," Schultz said. "Believe me, we'll use every method possible."

The use of facsimile has receded somewhat as early concerns that China was monitoring fax communications proved true. At Brandeis University, for example, Chinese students were fearful that by faxing information to a particular number, "it would be like pointing the evil finger at a person," said Judith Humphries, an Interlibrary Loan coordinator at Brandeis.

Another information highway involves access to worldwide global networks owned by multinational firms that have offices in China. "There are eyewitness accounts [to the Tiananmen Square massacre] that have come through" on the electronic network of one major computer vendor, Schultz confirmed.

According to news reports last week, the government keeps close tabs on citizens via a network of informers, area councils and, in some cases, inputs information into electronic databases.

IS abroad unaffected, but tech flow slowed

BY MICHAEL ALEXANDER
CW STAFF

The upheaval in China has not had a measurable impact on the information system operations of joint ventures there, but it is likely to have a chilling effect on many companies' plans to import technology and set up shop there, according to expert China watchers.

IS operations for Sheraton Corp., which has four hotels in China including one in Beijing, have not been disrupted by the unrest, said Larry Hall, director of hotel systems and telecommunications worldwide.

"When we started, we had many [expatriates] employed in IS, but part of our agreement was to turn over operations in the hotels to the nationals, and that we have done," Hall said. "Some IS employees have had trouble getting to work, as have employees across all departments, but it has been fairly quiet."

Manager shift

McDonnell Douglas Corp., which has a sizable joint venture with the Shanghai government to assemble passenger aircraft there, relocated 51 managers to Hong Kong, said Nissen Davis, a spokesman for McDonnell Douglas Information Systems Co. The company's IS technology in Shanghai is limited to a handful of computer-aided design and manufacturing workstations, and users have been unaffected by the turmoil, Davis added.

The factory is still working, though U.S. government certification of the aircraft has been suspended, he said. "There has not been a major interruption of business per se," Davis explained. "We are there to do business, and we anticipate going back to that within a couple of weeks."

China's investment in information systems technology has been relatively small. Although foreign technology plays a crucial role in China's efforts to boost its economy, officials there have moved cautiously for fear of acquiring outmoded or inappropriate technology and accelerating an already growing trade deficit.

The International Trade Administration of the U.S. Department of Commerce calculates that exports of computer and telecommunications equipment to China amounted to only $252.7 million in 1988.

In the past year, the U.S. government has loosened controls on exports of several categories of high-technology goods including computers, telecommunications and semiconductor manufacturing equipment. However, China analysts now predict that the U.S. may restore at least some restrictions in political retaliation against Chinese officials for violently suppressing dissent.

One negative side effect will be that companies looking to export information systems technology into China to use in joint ventures already under way may not be able to do so, experts said.

"High-tech in China is highly regulated and most sensitive to political concerns," said Ed Morrison, president of China Trade Corp., a research and newsletter-publishing firm in Cambridge, Mass.

Meanwhile, U.S. companies doing business in China have been advised by the U.S. State Department to evacuate their expatriate managers, which could leave IS operations leaderless.

WIDEWORLD PHOTOS

Demonstrators *and soldiers in Tiananmen Square*

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January of 1989 by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.
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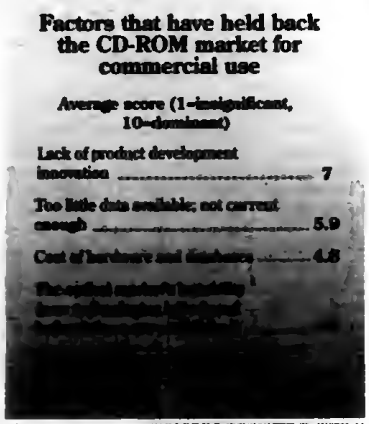
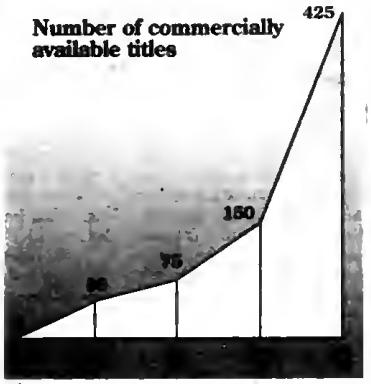
TRENDS

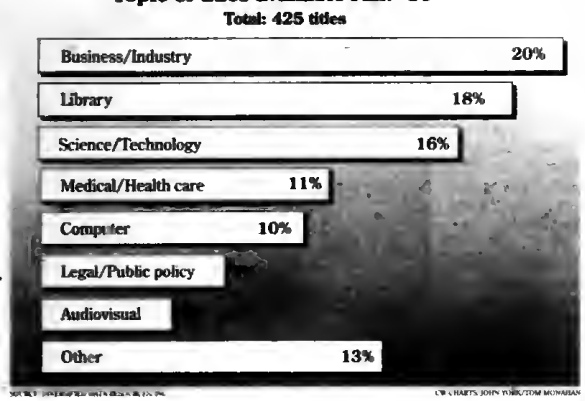
Hype about a boom in compact disk/read-only memory (CD-ROM) technology has been heard for years. But the big bang hasn't happened yet. Market estimates show steady, healthy growth, but industry participants and observers see need for more work.



A survey asked *CD-ROM publishers and analysts to assess their market. Results suggested that industry players don't see the market growing as fast as outsiders expect. In the commercial market, respondents said, lack of product development innovation has been the biggest obstacle.*



Today, *applications commercially available on CD-ROM number in the hundreds, but growth was slow until last year. Applications are expected to fare better in the coming years, as CD-ROM becomes more widely accepted.*



The largest number *of titles are business or industry applications, but there is a wide variety of subject matter available on CD-ROM.*

NEXT WEEK

In Executive Report, **Joe Contorno,** vice-president of Citibank NA's Consumer Services Group-International Systems, says that using workstations and IBM AS/400s as the primary development platforms enabled his group to achieve greater levels of responsiveness than was possible with a mainframe.

ANDY FREEBERG

Photonics — optical devices that use light rather than streams of electrons to transmit data — may be the new wave in computing technology. Just as IS got used to transistors, VLSIs and gallium arsenide, here come diffraction gratings, polarizers and transphasors. In Depth explores these new technologies.

INSIDE LINES

China hot line needs funds

Students staffing the China Information Center, an Auburndale, Mass.-based national hot line service sponsored by the Walker Ecumenical Exchange (WEE), have so far racked up $30,000 in phone charges in their effort to disseminate information about the crisis in China. Supporters who would like to help defray those and other related expenses can send contributions to the "Democracy for China Fund," c/o Bank of Boston, Box 151, Boston, Mass. 02101. Vendors or computer specialists who would like to donate equipment or expertise can contact WEE at (617) 969-3919.

HP to DEC: Drop dead!

HP quickly rebutted assertions made at a DEC briefing last week that the plug has been pulled on Apollo's high-end workstations. "In the next 18 to 24 months we'll upgrade the CPU board — easily doubling the 20 MIPS now available" on Apollo's Series 10000 line of workstations, said Bob Weinberger, director of systems product marketing for HP's new subsidiary.

Decision near for Data Design

Word went around last week that Integral Systems (ISI) in Walnut Creek, Calif., a maker of human resources software for IBM mainframes, had acquired Data Design Associates (DDA) in Sunnyvale, Calif., a financial applications software house. ISI had previously purchased a 20% interest in DDA. An ISI spokesman would not comment on the rumors, but DDA said the two companies are discussing a merger, although no decision is expected for three weeks.

Interlocking sanctions

Trade sanctions could force Amdahl to quit importing supercomputers from Fujitsu in Japan. With U.S. trade officials thinking about taking retaliatory trade sanctions against Japan, Amdahl officials believe Japanese-made supercomputers may be on the hit list. Although the company has sold only "a couple," a spokesman said that the company would quit importing the machines if sanctions were applied. A Japanese delegation is meeting with the trade representative this week to discuss the dispute.

Beta right than early

A beta tester of the OS/2 Presentation Manager version of Microsoft Excel says that everything works fine, except for graphs, which seem to shut down the system every time. Microsoft is still shooting for an early summer release. Meanwhile, a beta tester of Lotus' 1-2-3 Release 2.2 has been pounding away but has yet to break the software; in his mind, the thing is ready to go, but Lotus sees August as a more reasonable release date.

Boston Bank reshuffles, again

John Rogers, who replaced Bill Synnott in the top IS job at Bank of Boston Corp. two years ago, has himself been succeeded by another well-known manager, Kevin Moody, formerly the top IS exec at Gillette Co. Moody began consulting for Bank of Boston last year and then joined the company in an arrangement he calls a "partnership" with Rogers. Rogers departed in April and now has a senior management position at a New Hampshire subsidiary of First Deposit Corp. of California. Moody says he has taken over on an interim basis and is uncertain if he will stay. The bank declined to discuss reasons for the departure of Rogers, who was unavailable for comment.

AT&T to grab a piece of the rock

According to an attorney who is working on the negotiations, The Prudential Co. will be the next company to sign up for Tariff 12 — probably this week.

If IBM is rushing out with a 486 product announcement this week (see story page 1), months ahead of the availability of the chip, does that indicate the company is really rattled by market perception that it is losing its leadership position in the PC industry? You tell us what your IBM salesmen are saying: upload info to our bulletin board at 508-626-0214 or call up News Editor Pete Bartolik at 800-343-6474 or 508-879-0700.

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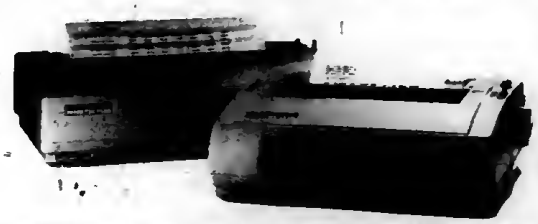

The Pinwriter P5300: PC WORLD'S "Best Buy"

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NEC Information Systems, Inc., Dept. 1610, 1414 Massachusetts Ave., Boxborough, MA 01719.

The way most computers are used is an insult to their intelligence.

Your brilliont computer moy be dumber thon you think.

The sad fact is, while thousonds of businesses have hooked up personal computers to mainframes, the majority of those computers ore used os "dumb terminals," leoving o vost potentiol untapped.

For MSA, the intelligent workstation is a promise thot should be kept, which is why we ore proud to introduce BrightView™ opplications software.

By harnessing the power of cooperative processing, BrightView enables the intelligent workstotion to perform tasks previously restricted to the mainframe. This revolutionizes the efficiency of your entire computer system, meaning each component can now do whot it does best, with valuable mainframe resources freed up for more appropriate tasks.

What's more, MSA is the first company committed to delivering the most extensive line of SAA-compliant software in the industry, and BrightView is already in compliance with SAA's most advanced component, Common User Access. It yields a friendly, consistent look and feel to workstotions, helping maximize your investment in both personnel and hardware.

Whatever your software applications needs are, it might be wise to call Robert Carpenter at 404-239-2000. In fact, it's really the only intelligent thing to do.

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